



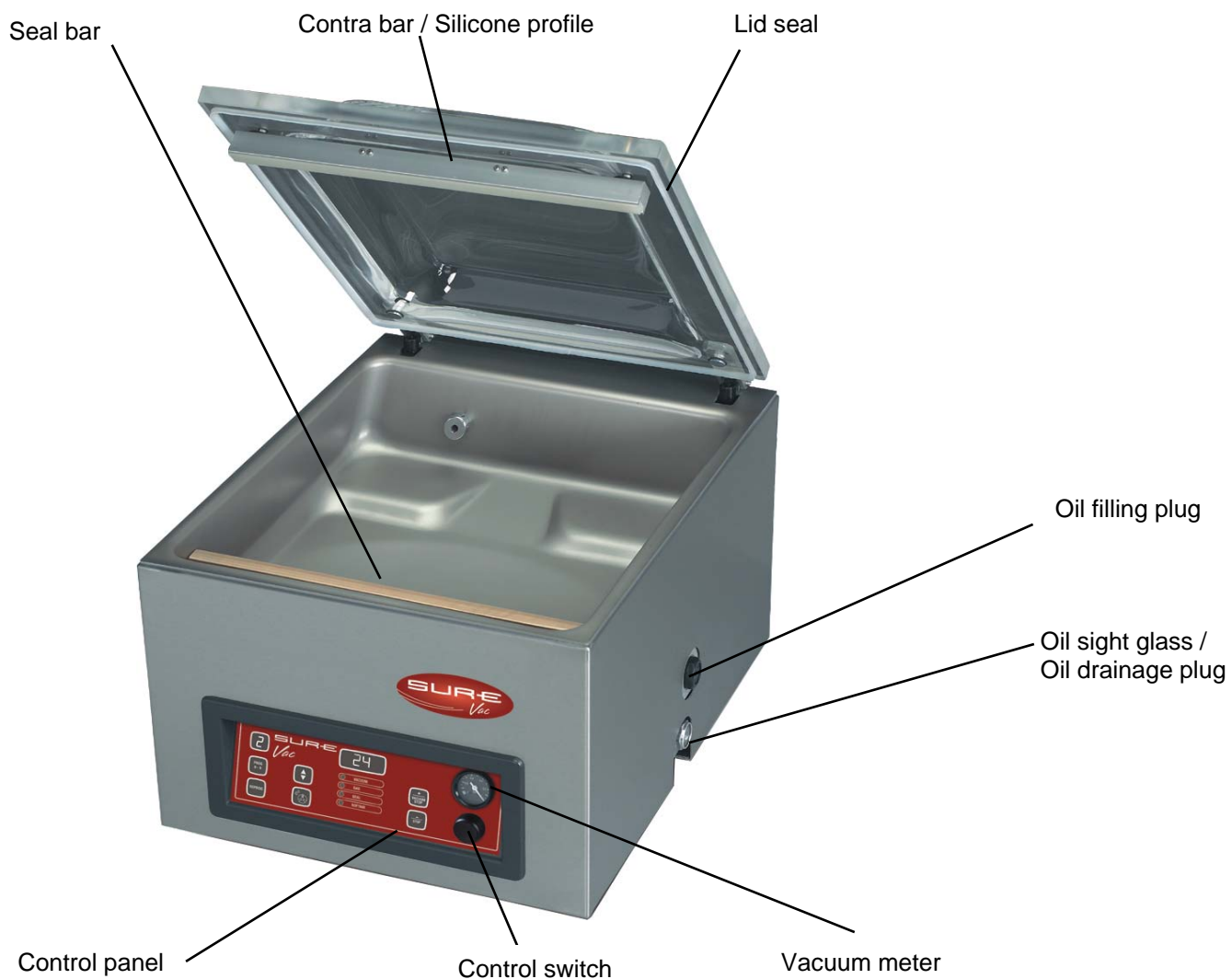
TECHNICAL TRAINING



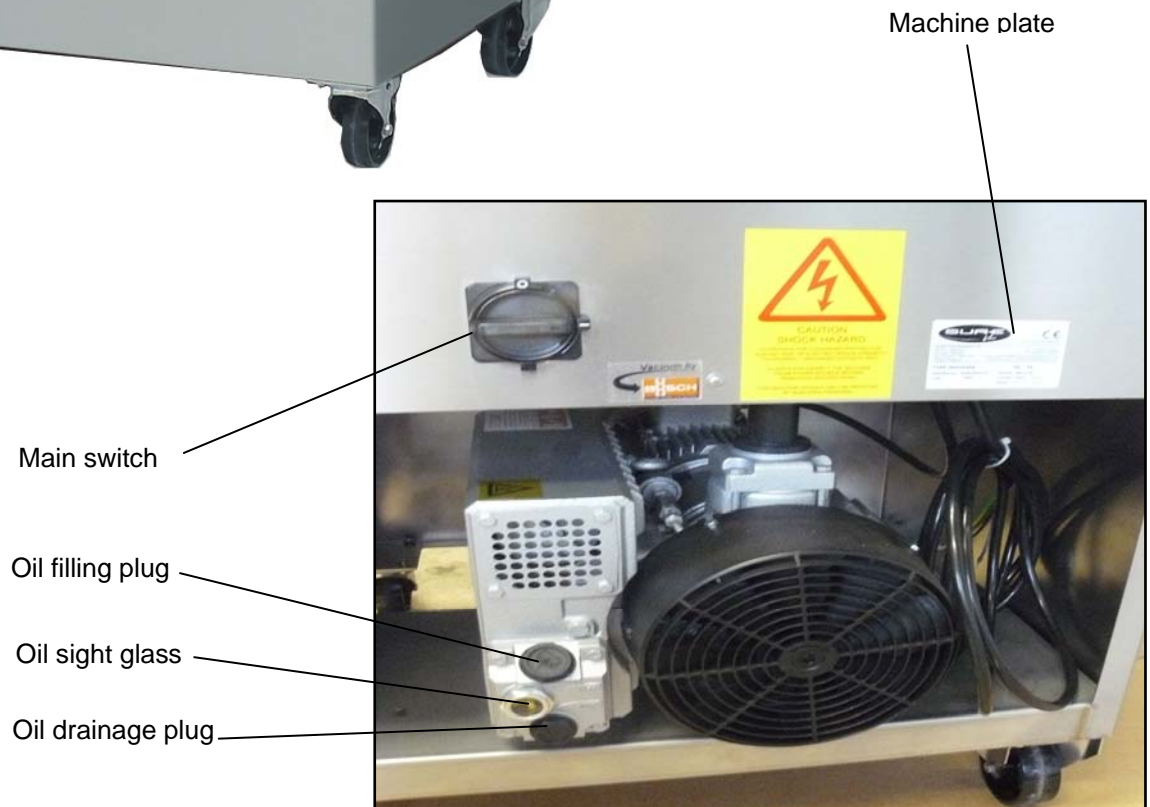
Marc Dimmers

Customer Support Manager

IMPORTANT COMPONENTS IN THE MACHINE



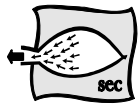
IMPORTANT COMPONENTS IN THE MACHINE



1.0 Technical functions of a vacuum packaging machine:

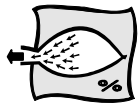
Vacuum: Sensor & time control, 10 program control system

DIGITAL TIME CONTROL



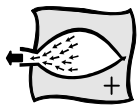
All the machines are equipped with digital controls as standard. These controls allow the separate programming of the time control of all sub-processes in the packaging process (vacuum, seal, decompression and possibly gas flush and soft-air). It is also possible to record the settings of frequently used packaging processes in one of the 9 programs. The controls are extremely easy to comprehend and simple to operate.

SENSOR CONTROL



With Sensor control, the packaging process is controlled by means of an accurate pressure sensor. This pressure sensor ensures that the process is finished accurately according to pressure values, expressed in percentages, programmed in advance. Application of the pressure sensor ensures consistent packaging results and an optimum cycle time. Sensor control is normally used in combination with a gas flush system.

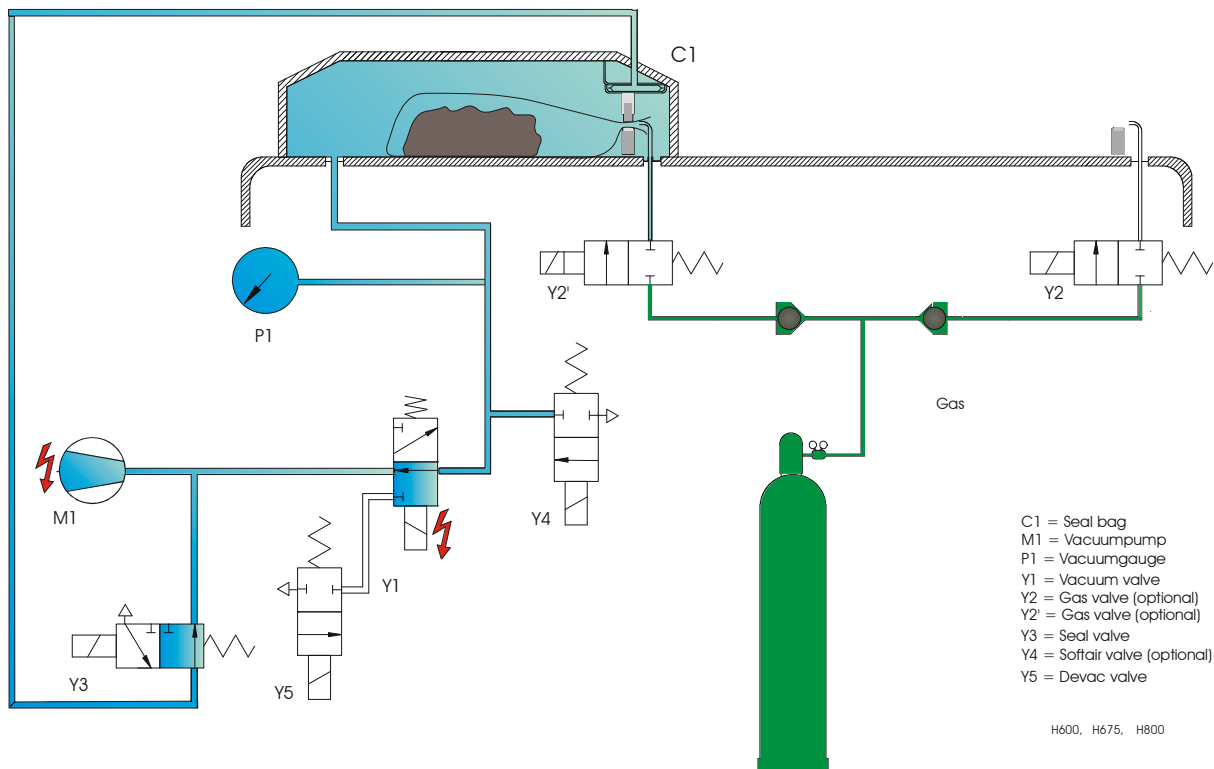
SENSOR CONTROL - Vacuum Plus time



Sensor control makes it possible to program an additional vacuum period - vacuum plus time after reaching the programmed pressure. Vacuum plus time is used to allow the air trapped in the packaging to escape, thereby creating an optimum vacuum. Vacuum plus time can only be used when the vacuum sensor pressure has been set to 99%.

SENSOR CONTROL - Time control

A sensor control can also be programmed for normal time control. The sensor will then be deactivated and the packaging process will be carried out according to the programmed cycle times.



Vacuum phase

Vacuum: Quick Stop H₂O sensor

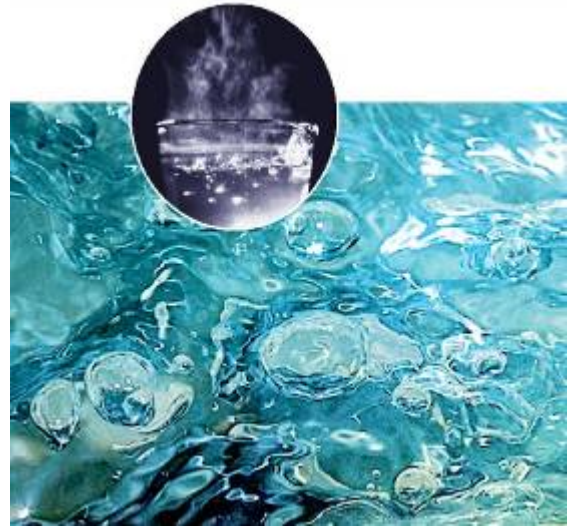
During the vacuum cycle, the product can boil and evaporate despite a cold temperature. The negative consequences for the shelf life, the general hygiene and the maintenance of the machine are obvious.

We have invested a lot of effort to put together a sensor allowing the detection of the « boiling point » of a product. The evaporation depends of several factors such as the surrounding pressure, the viscosity and the product temperature.

Available from the 10 program control system this function is avoiding unnecessary boiling phases. It permits, among other:

- ✓ quicker vacuum packing cycles.
- ✓ better protection of the product qualities (prevention of desiccation, food more juicy...)
- ✓ an appreciable better hygiene as the liquid is not flowing off anymore into the chamber.
- ✓ a better protection of the pump against humidity and corrosion.

The Quickstop H₂O sensor is available as a new command system. It is associated with our “classical” pressure sensor and works in percentage.



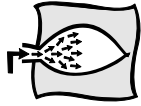
Vacuum: Fresh Meat program

A special option in the software of the control board ensures a conservation for fresh meats. This special software diminishes air entrapments (bubbles) in the package and therefore significantly increases the self life of the product.

By allowing a certain amount of air inside the chamber directly at the beginning of the sealing phase, degassing of the meat during the full time of the sealing phase is prevented.

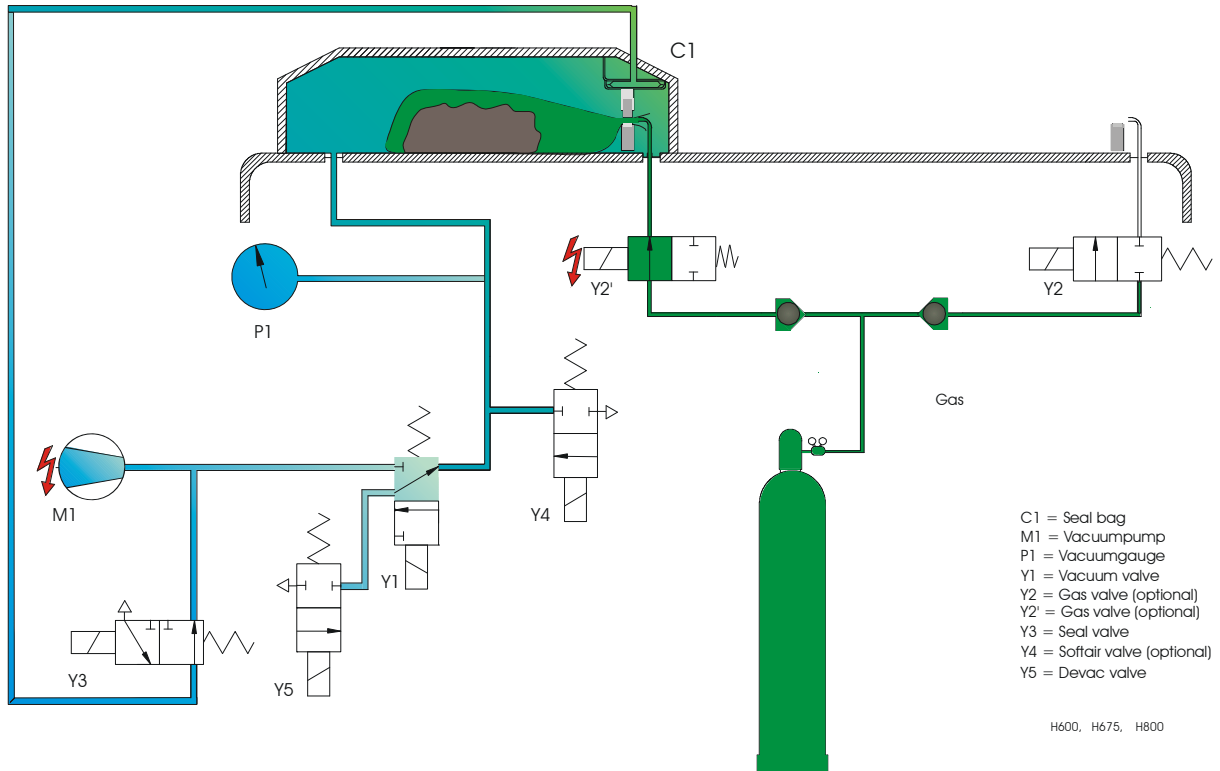


Gas: Sensor & time control



GAS FLUSH SYSTEM

A gas flush system provides the option to fill the vacuum bag with a quantity of gas after the termination of the vacuum cycle. This option is frequently used for vulnerable or fragile products or if the gas provides the product with added value (e.g. product presentation or storage life).



Gas flush phase

Pressure and volume behavior during the normal vacuum gas flush cycle

Situation 1:

At the end of the vacuum phase the pressure inside the chamber and inside the vacuum bag are equal.

Situation 2:

While gas flushing the volume of the vacuum bag will increase due to an increasing pressure.

The pressure inside the chamber will also rise, but not as quickly as inside the bag.

Situation 3:

At a certain point the volume of the vacuum bag will not increase anymore, and extra gas will be pushed outside the vacuum bag and inside the chamber. The pressure inside the chamber will increase.

Situation 4:

If the pressure inside the chamber increases and reaches the point where the pressure is equal to the pressure inside the vacuum bag. At that point the volume of the vacuum bag will decrease.

Situation 5:

The moment we seal the pressure inside the chamber and the vacuum bag is equal.

Situation 6:

The moment we decompress, the volume of the vacuum bag will decrease.

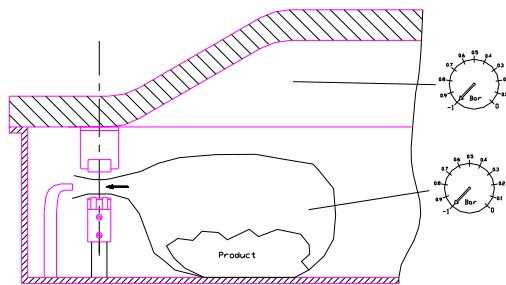
The reduction of the volume will stop when the pressure inside the vacuum bag is equal to the surrounding atmosphere.

The amount of gas inside the vacuum bag is depending on several issues:

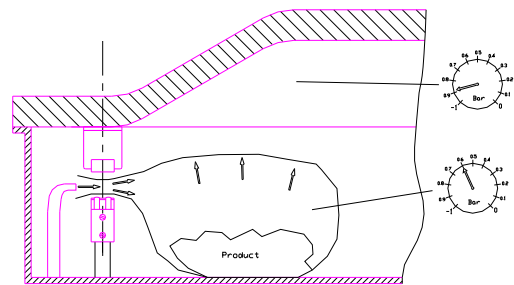
Gas pressure, shape of the product, proportion between size product and the size of the vacuum bag.

If you put a small product in a relative big size of vacuum bag, there is a lot of “free” space, so it is easy to reach a high volume of gas inside the package.

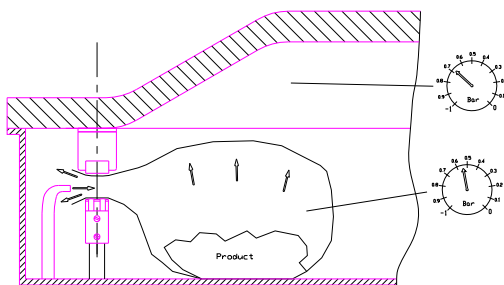
Situation 1



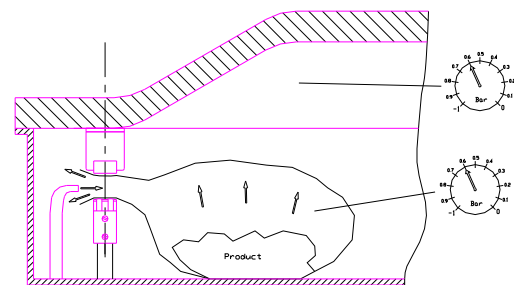
Situation 2



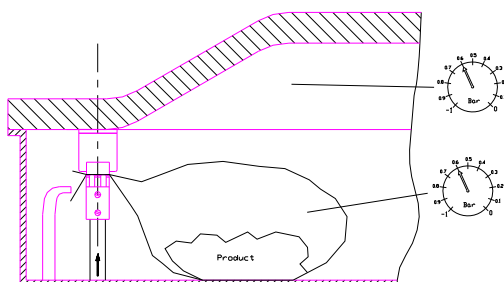
Situation 3



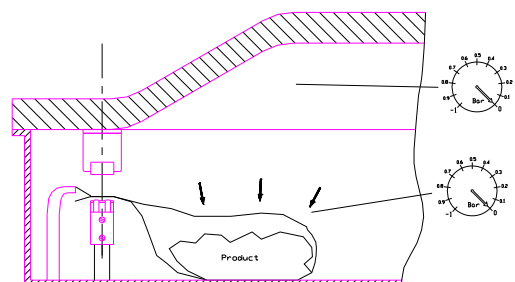
Situation 4



Situation 5



Situation 6



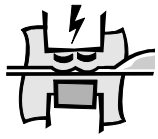
Gas: Additional gas flush option

With this additional gas flush adjustment we realized two major improvements;

- Much better consistency of quality of gas in each package.
- It is now possible to create balloon type of packages.



Sealing



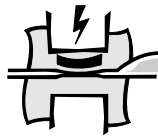
DOUBLE SEAL

The vacuum bag is sealed with two 3.5 mm concave wires. The wires used have a rounded concave shape. This shape ensures that moisture and dirt on the seal seam is pushed to the side, closing the packaging cleanly and completely. Two seal wires provide extra security against rough handling of the packaging during transport and storage.



CUT-OFF SEAL

The vacuum bag is sealed with two wires. The inner seal wire is 3.5 mm wide and has a rounded concave shape, and the outer seal wire has a diameter of Ø 1.1 mm. The outer wire has two functions: this wire creates a narrow seal, and the remaining flap can be torn off manually due to the fact that the wire almost completely burns through the bag. This provides optimum product hygiene during transport and storage.



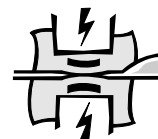
8 mm SEAL

The vacuum bag is sealed with a single flat seal wire, 8 mm wide. This seal system is used especially for packaging in which presentation is an important factor.



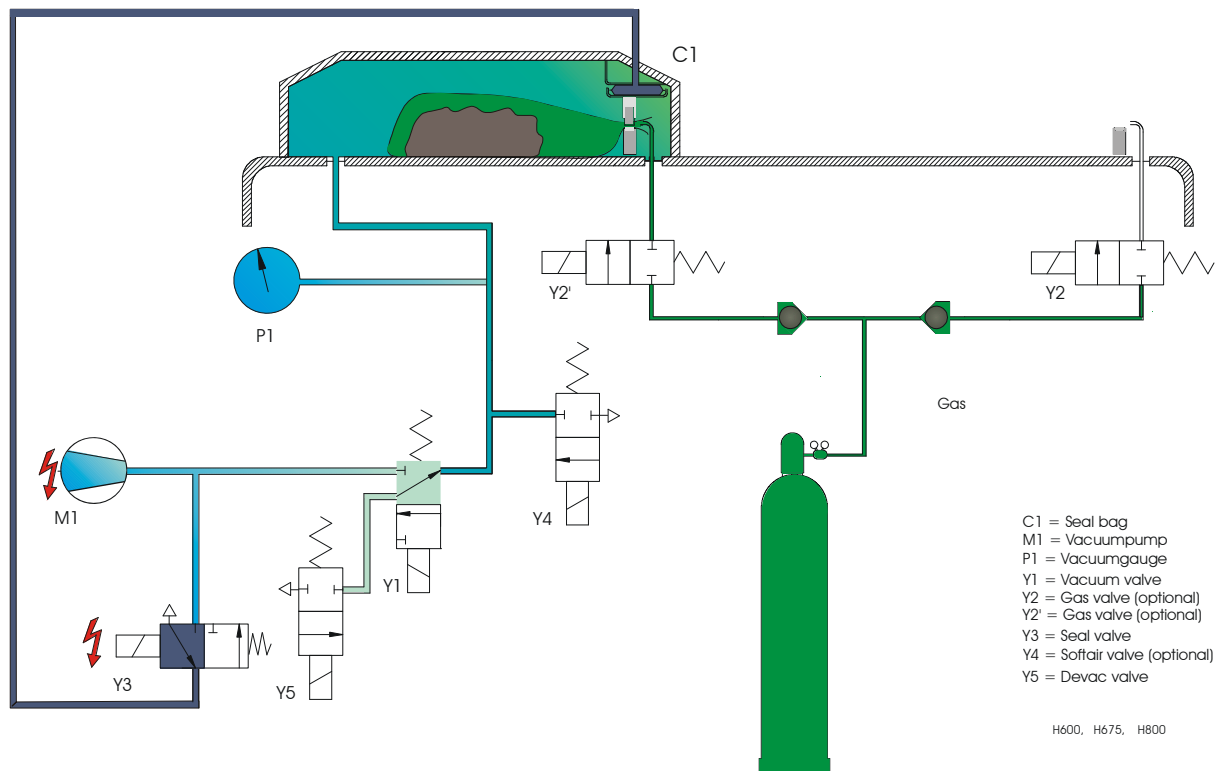
SEAL 1-2

The vacuum bag is sealed with two wires. One wire is 3.5 mm wide with a rounded concave shape, and the other wire has a diameter of Ø 1.1 mm. The function of SEAL 1-2 is the same as the CUT-OFF but provides the option to control the wires separately. This makes it possible to activate the cut-off wire for longer time than the seal wire. This modification makes it possible to seal and cut-off almost any type of bag, e.g. shrink bags.



BI-ACTIVE SEAL

Bi-active seal has a seal wire both on top and bottom. This principle enables seals to be produced from the bottom and the top simultaneously, with the aim being to produce the optimum amount of heat in the vacuum bag. This seal system is applied to bags with a thickness of 200+ µm, or, for example, laminated aluminium bags.



Sealing phase

Sealing cycle step by step

The complete seal activity step by step,

1. pre-seal (pneumatic action) Default settings for table models 1 second, and double chambers 2,5 seconds. (situation 3)
2. actual seal time (electrical action) settings depending on the thickness and quality of the vacuum bag (situation 4)
3. After-seal (cooling time) Default settings for double chambers 3 seconds. (situation 5).

During the vacuum process there is a gap (opening) between the top part (seal bar) and lower part (silicone holder). Through this gap the air inside the vacuum bag can escape.

If the vacuum cycle is finished the seal action will start. It will start with pre-seal.

The explanation of pre-seal:

To start with the electrical sealing we have to close the gap between the top part and lower part, the time necessary to close the gap we call "pre-seal". So pre-seal is only the movement of the seal bar.

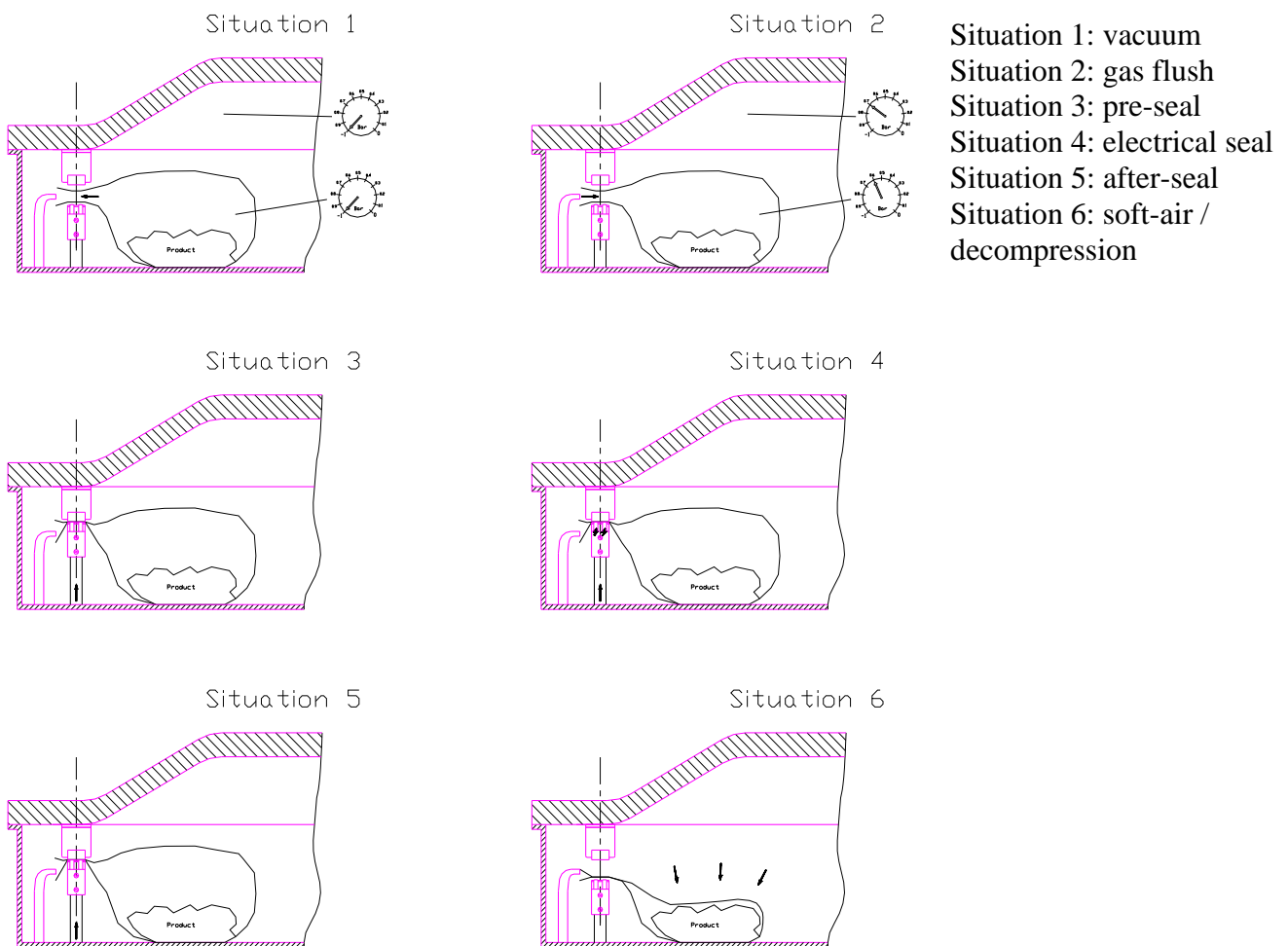
If the gap is closed (the seal bar is pushed onto the silicone holder), we start the actual sealing time.

Now the seal wires are electrical activated and will heat up.

During the actual sealing time, if the seal bar is resting on the silicone holder, the seal wire can transmit the generated heat, to the vacuum bag or the silicone profile. For a proper seal, It is essential that all the generated heat is transmitted to the bag.

After finishing the seal time, we want to make sure that al remaining heat is also transmitted to the bag. This time we call "after seal time". For a constant sealing time, specially in case of short vacuum cycles, it is very important that all generated heat can transfer to the vacuum bags, otherwise the residual heat (the amount of heat that was not able to transfer to the vacuum bags), will heat up the seal bar itself. And it is possible that the seal is to hot with the next cycle. If this is happening we recommend to increase the after seal time.

Due to different circumstances it ma be necessary to change the default settings.



Influence from using gas flush, on seal pressure (1-3)

Vacuum phase

Pressure inside complete system -1 bar

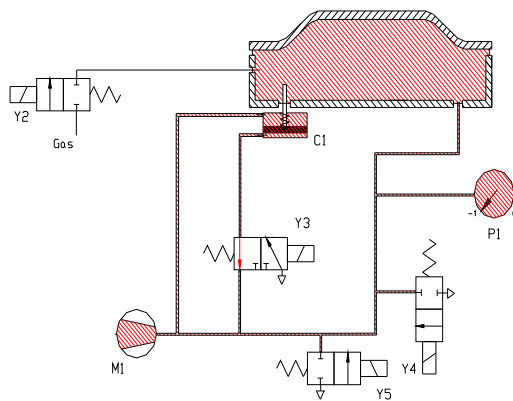


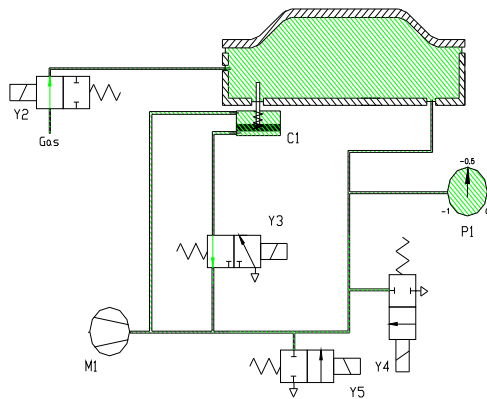
Table Models

using seal cylinders for seal pressure.
Pump start and stops every cycle.

- C1 = Seal cylinder
- M1 = Vacuum pump
- P1 = Vacuum gauge
- Y2 = Gas valve
- Y3 = Seal valve
- Y4 = Soft-air valve
- Y5 = Decompression valve

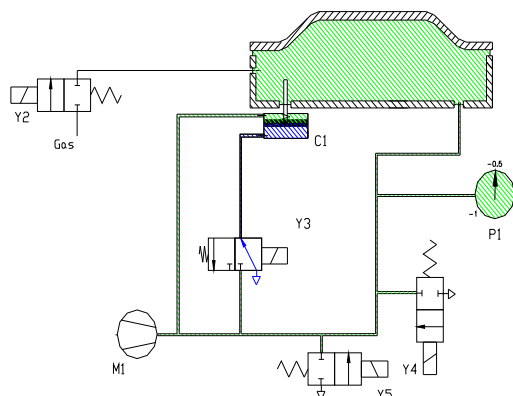
Gasflush phase

Pressure inside complete system - 0.5 bar



Seal phase

Pressure difference for sealing
in case of full vacuum
-1 bar in complete system, against outside air
= 1 bar sealpressure
in case of gasflush
-0.5 bar in complete system (also top side sealcylinder)
against outside air = 0.5 bar sealpressure

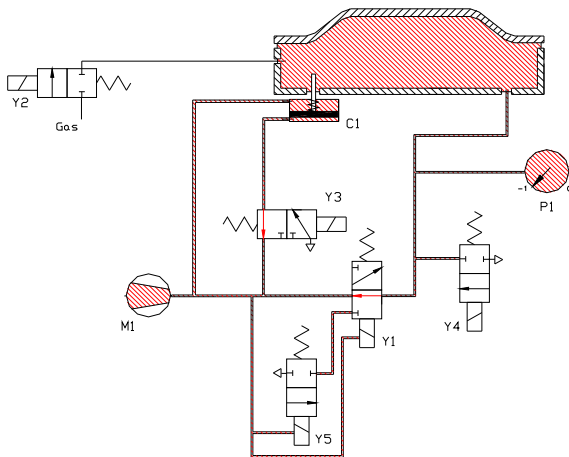


Conclusion:
If using gas flush, seal pressure
decreases with Table Models Machines

Influence from using gas flush, on seal pressure (2-3)

Vacuum phase

Pressure inside complete system -1 bar

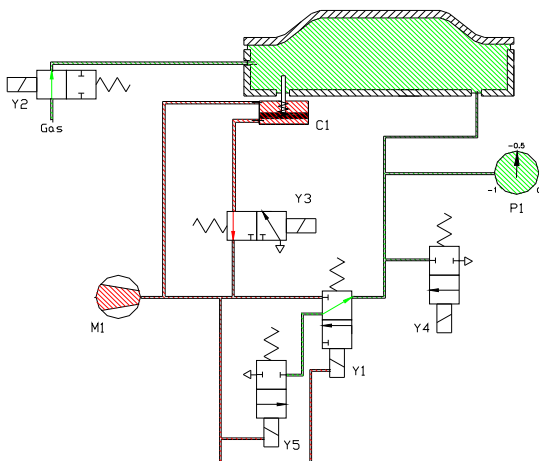


Single Chamber Models using seal cylinders for seal pressure, pump running constantly.

- C1 = Seal cylinder
- M1 = Vacuum pump
- P1 = Vacuum gauge
- Y1 = vacuum valve
- Y2 = Gas valve
- Y3 = Seal valve
- Y4 = Soft-air valve
- Y5 = Decompression valve

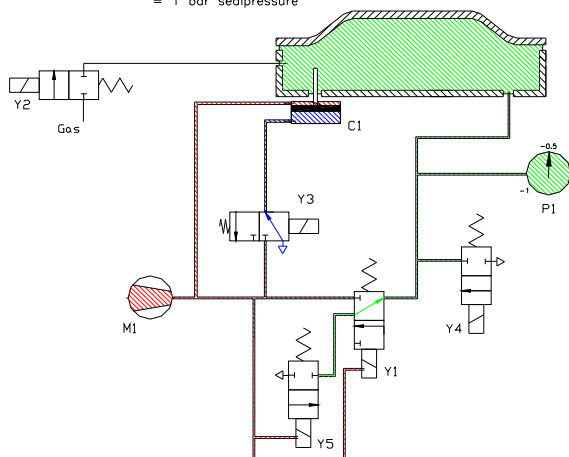
Gasflush phase

Pressure inside chamber -0.5 bar
but -1 in top side sealcylinder
(vacuumvalve and pump continuously running)



Seal phase

Pressure difference for sealing
in case of full vacuum
-1 bar in complete system, against outside air
= 1 bar sealpressure
in case of gasflush
-0.5 bar in chamber, but -1 bar in top side sealcylinder
against outside air
= 1 bar sealpressure



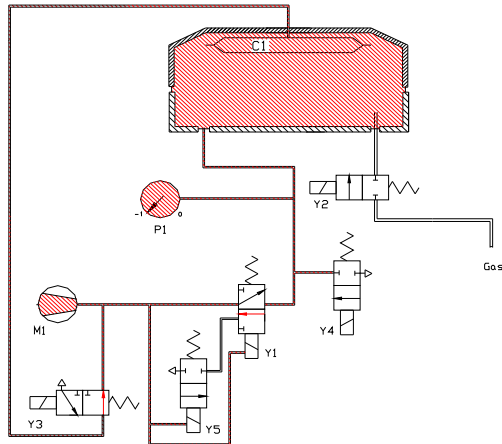
Conclusion:
Seal pressure is not dropping if using gas flush with Single chamber Models
Where the pump is running constantly

Influence from using gas flush, on seal pressure (3-3)

Single / Double- chamber Models using seal bags for seal pressure. Pump running constantly.

Vacuum phase

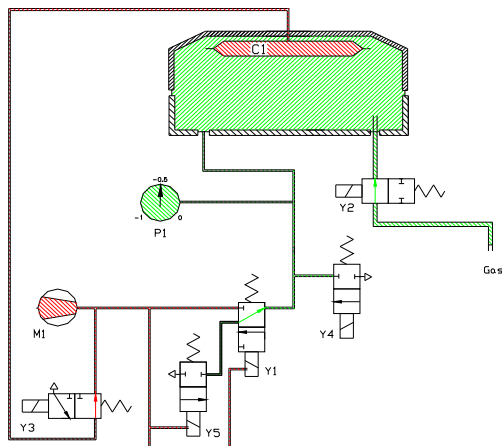
Pressure inside complete system -1 bar



- C1 = Seal bag
- M1 = Vacuum pump
- P1 = Vacuum gauge
- Y1 = vacuum valve
- Y2 = Gas valve
- Y3 = Seal valve
- Y4 = Soft-air valve
- Y5 = Decompression valve

Gasflush phase

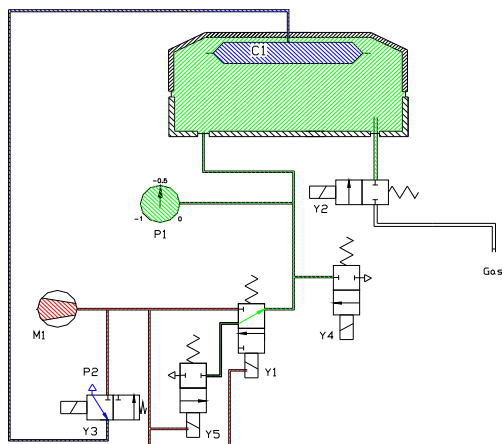
Pressure inside chamber -0.5 bar but -1 in seal system (vacuumvalve and pump continuously running)



Seal phase

Pressure difference for sealing in case of full vacuum -1 bar in complete system, against outside air = 1 bar sealpressure in case of gasflush

pressure difference against outside air = 0.5 bar sealpressure



Conclusion:

If using gas flush, seal pressure decreases with Single / Double chamber Models if equipped with seal bags.

Extra seal pressure

In a certain amount of situations it is possible that the seal pressure is insufficient. This will show itself by a very irregular and sometimes burned seal. In this case it is possible to have a special connection for compressed air. (see photo) One situation where it can occur is, if you use only partial vacuum.

This means if you only pack with 50 % of vacuum.

This also can happen with machines that are equipped with a gas flush option. By using gas flush the press force for the seal system will drop accordingly the setting for gas.

So if the setting for gas is 40 %, the actual seal pressure on the seal bars is also down to 40 %.

Therefore we mount on the different chamber machine, which are equipped with gas, an extra hose coupling on the backside of the machine. On this hose coupling it is possible to connect compressed air (max. 1 bar). With this extra compressed air connection you re-establish the full press force for the seal system.

A higher pressure will result in a permanent deformation from the seal system.



Seal pressure behavior form the various machines

Table top models

Pump starts and stops with every cycle, seal pressure is depending on pressure inside the chamber.

(SV2804TE, SV2808TE, SV3716TE, SV4216TE, SV3516TP, SV4221TP, SV4221TX and SV4221TB)



Single chambers machines (Equipped with seal cylinders)

Pump is running continuously, seal pressure is not depending on pressure inside the chamber.

(SV4663SP, SV5263SP and SV3263SP)



Single chambers machines (Equipped with seal bags)

Pump is running continuously, seal pressure is depending on pressure inside the chamber.

(SV5263SA, SV8010SA, SV8063SA, SV5263SS and SV8010SS)

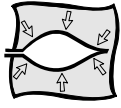


Double chambers machines (Equipped with seal bags)

Pump is running continuously, seal pressure is depending on pressure inside the chamber.

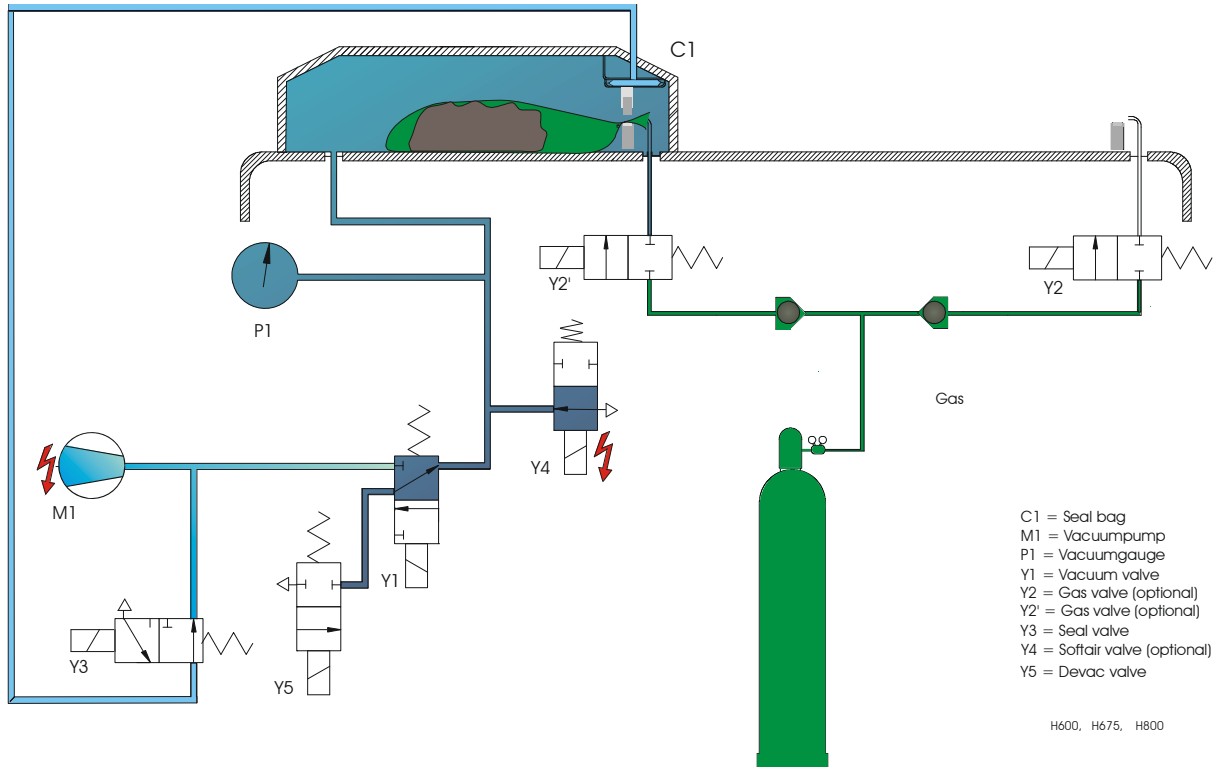
(SV4563DA, SV5510DA, SV6263DS, SV6210DS, SV6216DS, SV8430DS and SV1130DS)

Soft-air



SOFT-AIR (slow decompression)

Soft-air is a system that the chamber can be slowly decompressed for a programmable period following to vacuuming and sealing. The vacuum chamber is decompressed so slowly that the vacuum bag can shape itself around the product without damaging the product or the vacuum bag. Soft-air is used primarily for the packaging of soft and/or vulnerable products (e.g. fish), or products with hard protrusions (e.g. spare ribs).

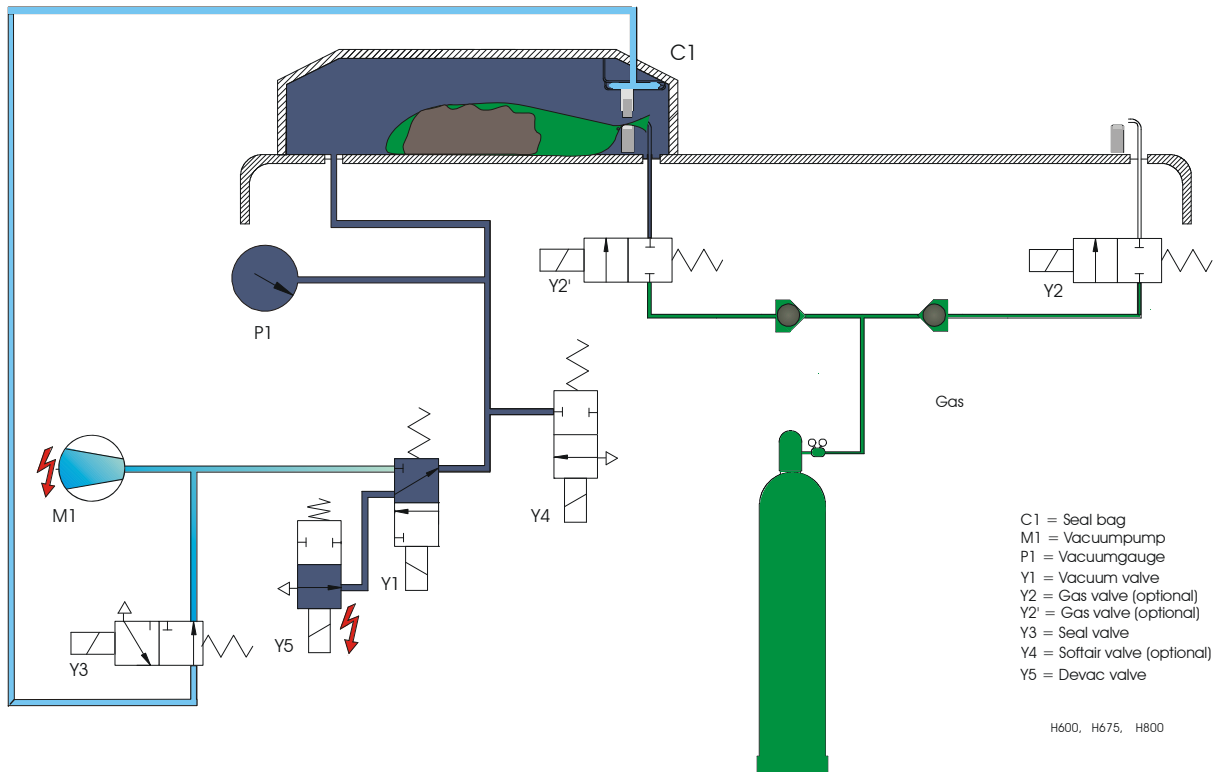


Soft-air phase

De-compression

DECOMPRESSION)

Decompression is the system that permits the outside air to enter the chamber till the pressure inside the chamber is equal to the outside air, and the lid is opens automatically.



Decompression phase

Extra Functions



Start codes

When starting the machine, first two codes appear on the large display in succession before control panel switches to operation mode.

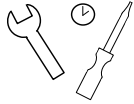


The first code indicates the execution / model of the machine.
The second code indicates the control software version.



Service Hours program

The service hours program is a service program which is used for installing a number of hours after which the panel shows "oil" in the second display, to indicate that the machine needs service. This program is used as memory to maintain a good and stable service program for the machine. With help of this option we can prevent that, if settled correctly, the oil is polluted in a way that it affects the optimal condition of the vacuum pump.



Conditioningsprogramme "C" (Special for table Models, but also necessary in case the sleeper function is activated)

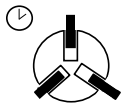
A conditioning program has been included to limit the contamination of the oil caused by the packaging of damp products (this means products that contain moisture, but also liquids and sauces).

Regular use of this option will prevent unnecessary oil changes and the possibility of pump corrosion caused by the excess water in the oil.



External vacuum function "E" (for all Table Models)

External vacuum function is included to make it possible to use special food containers. The function comes with a special adaptor which should be connected to the vacuum opening of the machine and suction opening of the food container. The function should be activated and set through the control panel as well



Sleeper Function (all single and double chamber machines)

Both the standard digital and sensor controls have the possibility to activate a sleeper function. The sleeper function ensures that the pump switches off after the period programmed into the sleeper function (while the controls remain active) if the machine is not in use for a significant period of time. The pump will automatically reactivate when the machine is used. This function eliminates unnecessary noise pollution caused by the pump. The sleeper function will only activate after the first cycle has been completed.

It is necessary for the pump to heat up for a minimum of 15 minutes prior to the packaging in order to allow it to reach its operating temperature.

Machine counter function

The machine counter function registers the use of machine and certain functions for a solid reference on the state and use of the machine.

Pump operation hours	Total hours which the pump has run.
Machine cycles	Total number of cycles which the machine has run.
Conditioning program cycles	Total number of cycles which the pump conditioning program has run.

Service detection (gate test function)

The service detection function can help you to check whether a certain selected function will working properly. This is convenient when the machine has a problem and the technician has not idea yet where might be the cause of the problem.

With the help of this mode all function of the machine can be tested not only electrically But on there full function.

Special option for Stainless steel swing lids.

Volume reduction by Lid filler plates.

Due to the volume reduction the cycle time shortens with 15-20 % and saving a gas consumption of 10-12 %!

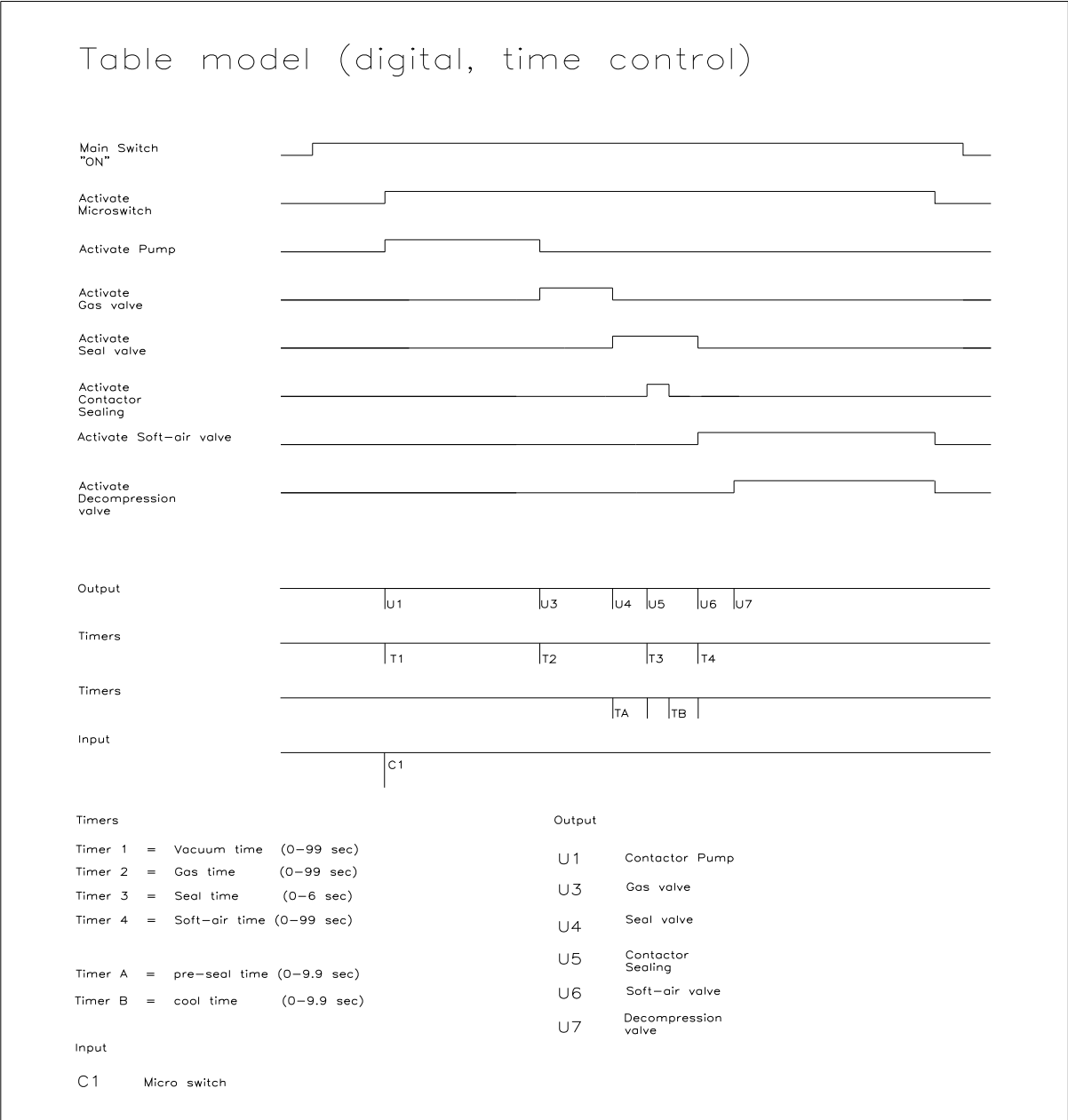
Calculation the savings on gas the gas consumption: the pay-back time is approx 2 month!.

These filler plates are available for all stainless steel swing lids. The material of the filler plates is in compliance with the European Directive for Food contact 90/128/EEC and its amendments. This means it is allowed for utilization in the food processing equipment.



Time / Function Diagram.

Table models (10 program control)



Active cycle start the moment the lid is closed and the micro switch is activated. C1

Pump start to run, and the digital control is counting. U1

No vacuum valve mounted (the non return valve inside the vacuum pump is taking over this function)

If vacuum time is ended, the pump stops. T1

Now the gas function is active, "T2". U3

After ending the gas time the seal function is started. T2

The seal function is divided into two separate actions. The pneumatic part: activating "U4"

(moving of the seal bar) U4

The electric part: activating the seal contactor "U5". (heating up the seal bar). U5

"T3" is the seal time, the setting is depending on the thickness and the quality of the vacuum bag T3

The time "TA", after activating the seal valve "U4" but before activating "U5" contactor sealing, is called pre-seal time.

This is the time necessary to move the seal system against the counter bar.

The time "TB", after ending the seal time " T3" but before activating "U6" soft-air valve, is called cool time.

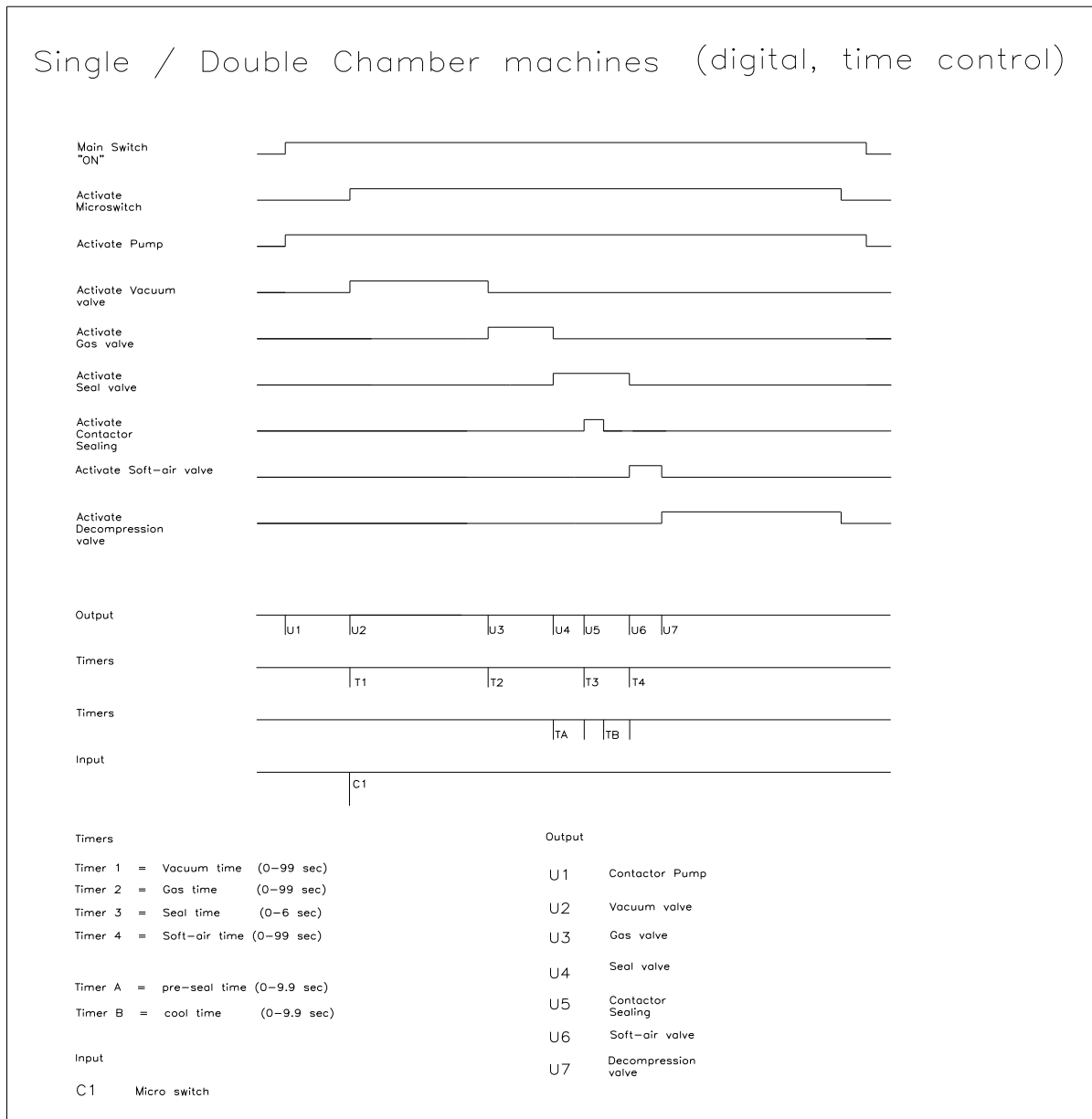
This is the time necessary to transmit the generated heat to the vacuum bags.

Now the soft-air function "U6" is activated U6

"T4" is the soft-air time, the setting is depending on the product. T4

And finally the decompression valve "U7" is activated till the lid is open, and the micro switch is de-activated. U7

Time / Function Diagram.



The moment the machine is activated, the pump start to run.

Active cycle start the moment the lid is closed and the micro switch is activated.

The vacuum valve is activated, and the digital control is counting.

If vacuum time is ended, the vacuum valve is de-activated. The pump is still running.

Now the gas function is active, "T2".

After ending the gas time the seal function is started.

The seal function is divided into two separate actions. The pneumatic part: activating "U4" (moving of the seal bar)

The electric part: activating the seal contactor "U5". (heating up the seal bar).

"T3" is the seal time, the setting is depending on the thickness and the quality of the vacuum bag

The time "TA", after activating the seal valve "U4" but before activating "U5" contactor sealing, is called pre-seal time. This is the time necessary to move the seal system against the counter bar.

The time "TB", after ending the seal time "T3" but before activating "U6" soft-air valve, is called cool time.

This is the time necessary to transmit the generated heat to the vacuum bags.

Now the soft-air function "U6" is activated

"T4" is the soft-air time, the setting is depending on the product.

And finally the decompression valve "U7" is activated till the lid is open, and the micro switch is de-activated.

U1

C1

U2

T1

U3

T2

U4

U5

T3

T4

U6

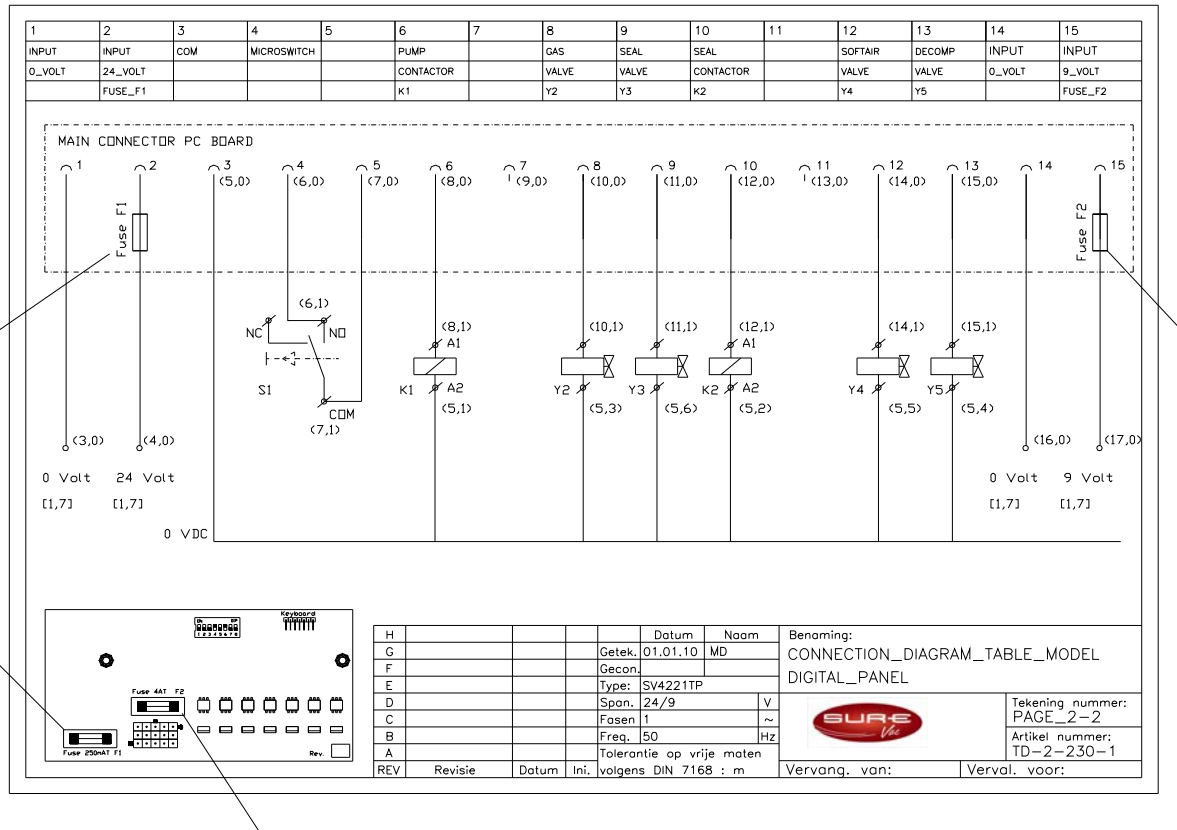
T4

U7

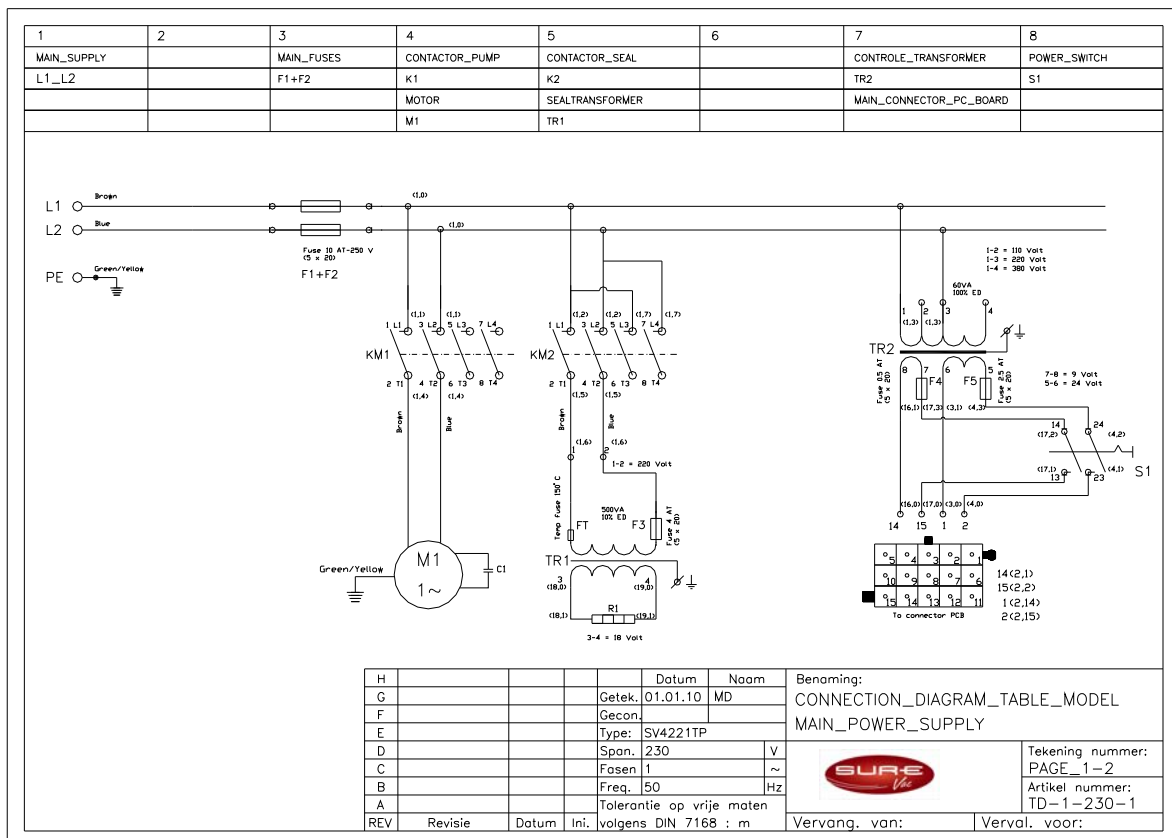
ELECTRICAL DIAGRAMS

We have divided the electrical diagrams into a main current and a control diagrams.

Control diagram SV4221TP model:



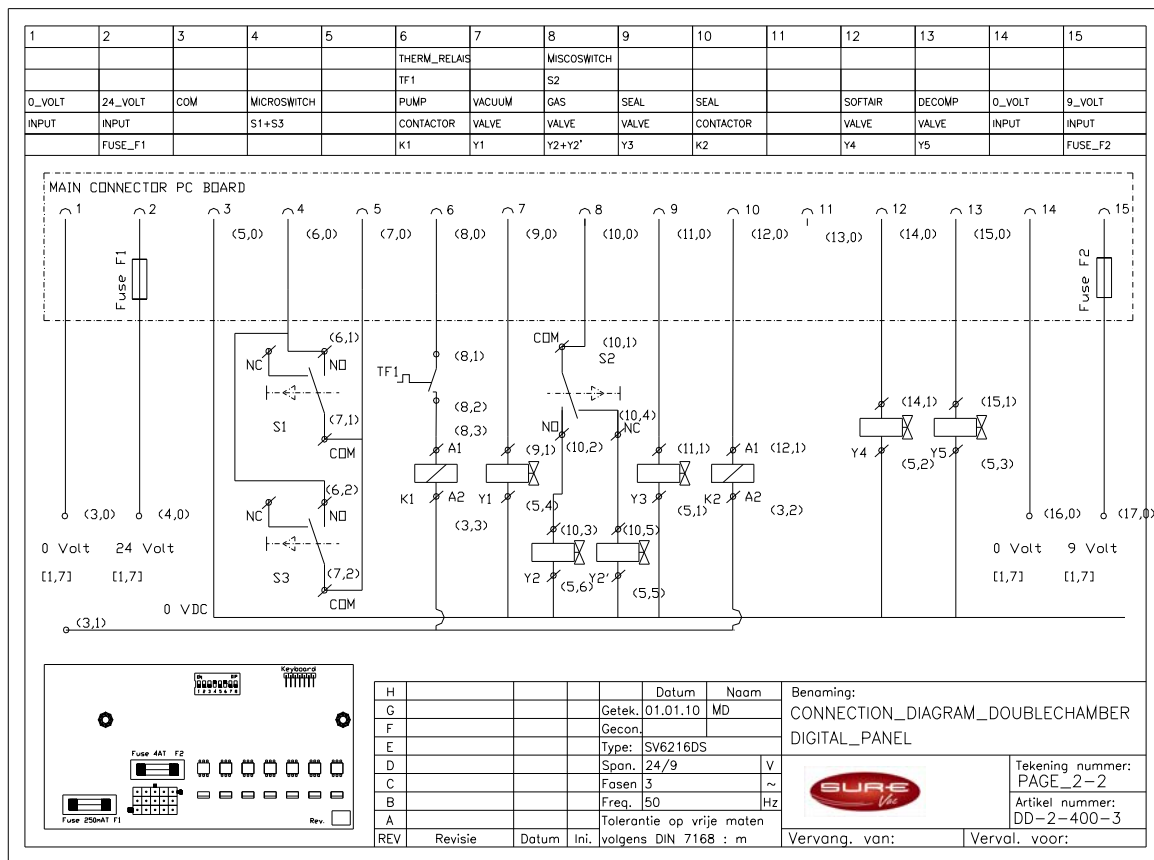
Main current diagram SV4221TP (230 Volt – 1 ~):



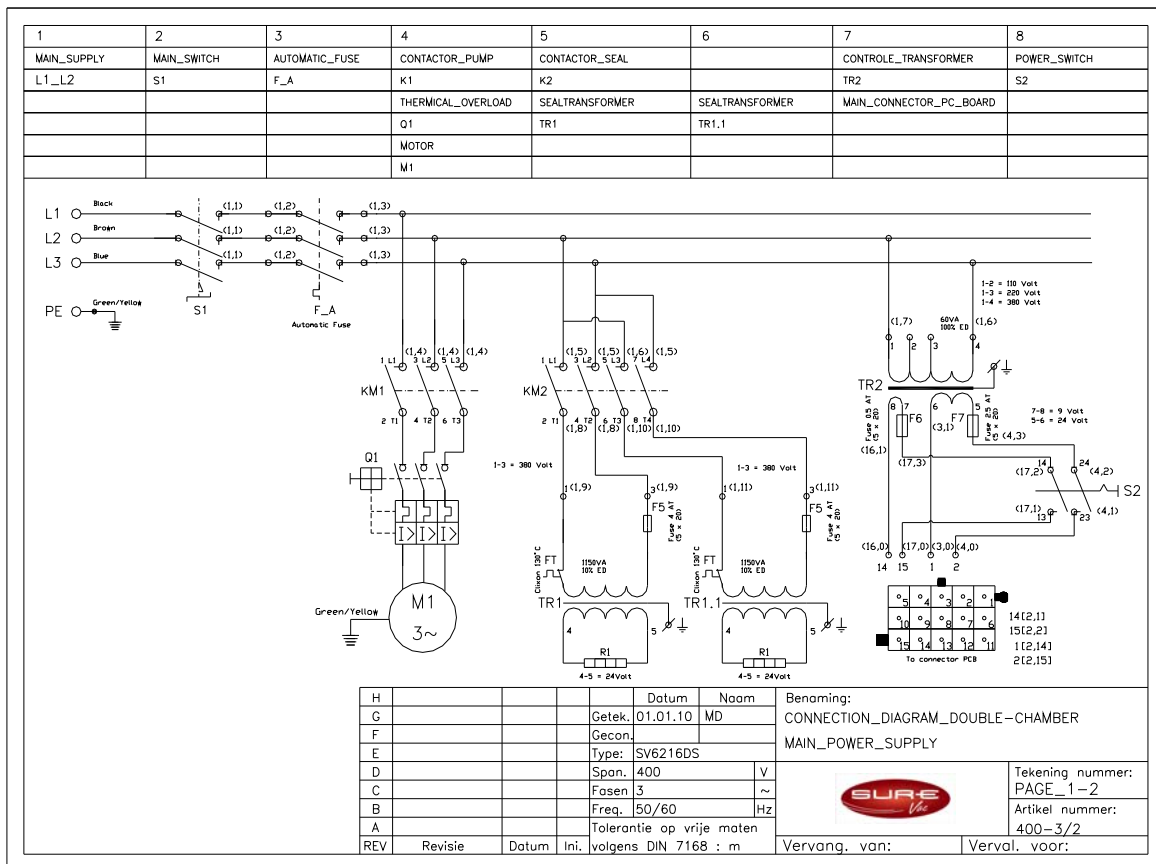
ELECTRICAL DIAGRAMS

We have divided the electrical diagrams into a main current and control current diagrams.

Control diagram SV6216DS model:



Double chamber Main current diagram SV6216DS (400 Volt – 3~)



DIGITAL CONTROL

Single program control system



CONTROL PANEL VERSION

Digital time control

The digital control is implemented with a function program that can be set with different function values per cycle (to be able to pack different products). A program cycle is the complete program of set functions (vacuum and seal) that the machine runs through to package a product.

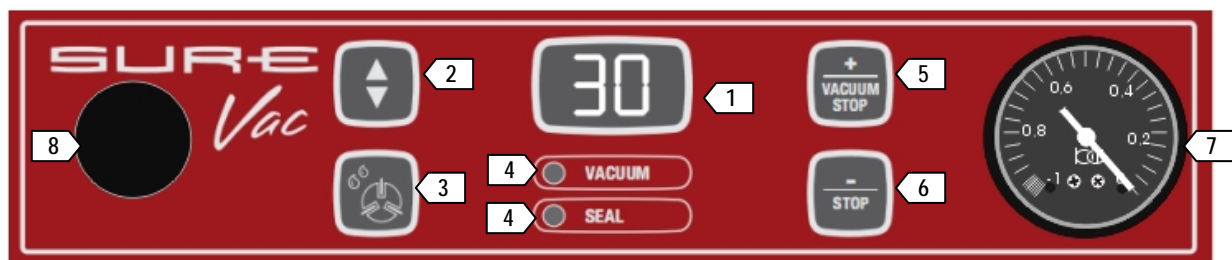
The control panel is implemented standard with a conditioning program for the regular maintenance of the pump and two STOP keys for complete function interruption or for only active function interruption. There are also a number of built-in service programs. Contact South Coast Systems for more information about these functions.

The value of the functions can be set for a certain time period.

The vacuum function can be set to whole seconds with a maximum of 99 seconds.

The seal function can be set with an interval of 0.1 seconds and a maximum of 6.0 seconds.

CONTROL PANEL LAY-OUT



1. Display

Displays the status of the active function during the run of the program cycle or the set value of the selected function when machine is not running.

2. FUNCTION SELECTION Key

Select function (vacuum or seal) for viewing or changing function values. The function is selected if the function light is on in front of the function description under the display.

3. CONDITIONING PROGRAMME Key

Start the conditioning program for pump (duration 15 minutes). For instructions on the program, see page 15.

4. FUNCTION Lights

A light in front of the function indicates that the function is active during the program cycle or that the function is selected for view or change.

5. + / STOP VACUUM Key

Function during cycle	Interruption of the active function during the program cycle. The cycle immediately continues with the next function.
General function.	Increment the value of the selected function.

6. - / STOP Key

Function during cycle	Terminates the program cycle completely. The cycle immediately switches into the ventilation function.
General function	Decrement the value of the selected function.

7. Vacuum meter

Displays the pressure in the vacuum chamber.

8. ON/OFF Switch

The ON/OFF switch is used to turn the machine on and off before and after operation. The switch turns on all units in the machine. Caution, the switch does not completely remove all power from the machine.

CONTROL PANEL USE

When the machine is turned on then the it is ready for use once the two operating codes have displayed.

Description of the program cycle for digital time control

1. Functions (vacuum and sealing) are set with the correct values
2. Close the lid.
3. Vacuum function
The machine starts to vacuum the chamber.
The light in front of [VACUUM] goes on.
Display : decrementing time per second starting at the time set (max. 99 sec.).
Vacuum meter starts increasing to the left.
4. Sealing function
Once the vacuum function is finished, the sealing function starts to seal the vacuum bag(s).
The light in front of [SEAL] goes on.
Display : decrementing time per 0.1 second starting at the time set (max. 6.0 sec.).
The reading on the vacuum meter stays the same.
5. Ventilating function
After ending the seal function the ventilating function starts ventilating the chamber to 1 atmosphere/ATO and the lid opens.
There are no longer any lights on in front of the functions.
Display : lines moving up and down until the lid is opened.
The vacuum meter runs back to the right to zero and the lid opens automatically.
6. The product is packed and ready to remove.

Set / change function values

The following steps must be followed to change the function values for vacuum and/or seal :

Press the FUNCTION SELECT Key to select the required function. The function light will light up when the function is selected.

Press the [+ / STOP VACUUM] or [- / STOP] keys for incrementing or decrementing the function values respectively. It takes 0.5 seconds before the value begins to change.

After changing the value(s) the machine must run through the cycle once (see previous page) to record the values.

Vacuum function

The vacuum function value can be incremented or decremented per second with a maximum of 99 seconds and a minimum of 2 seconds.

If while changing the vacuum function setting the [+ / STOP VACUUM] or [- / STOP] key is held down then the first 5 seconds will be incremented or decremented per second. Then intervals of 10 seconds will appear. If the key is released then the settings can be changed again per second.

Sealing function

The seal function setting can be increased or decreased with a maximum of 6.0 sec. and a minimum of 0.5 sec.

If while changing the vacuum function setting the [+ / STOP VACUUM] or [- / STOP] key is held down then the first 0.5 seconds will be incremented or decremented per 0.1 second. Then intervals of 1.0 second will appear. If the key is released then the settings can be changed again per 0.1 second.

START CODES

Service hours counter	Additional service indicator 120 hours	External vacuum	Display code
			00
X			02
		X	08
X	X		06
X		X	10
X	X	X	14

SERVICE MODE – PUMP CONDITIONING PROGRAM



The conditioning program ensures that the pump is thoroughly rinsed. During the program the pump and oil reaches operation temperature so that the oil can better absorb any moisture and contaminants and filter them. The high temperature enables any moisture in the pump to evaporate minimising the risk for rust spots.

The program lasts 15 minutes and it is advisable to run it at least once a week. Turn on the machine, press the key [conditioning program], and close the lid. The program runs automatically. During the program the large display will display moving lines.

The program can be interrupted at any time using the [STOP] key. It is however important for the sake of good maintenance that the program completes a full 15 minute cycle and therefore advisable only to interrupt the cycle for something urgent.

It is also advisable to run the program before using the machine for the first time, after the machine has been stationary for a lengthy period of time, and especially prior to changing oil.

SERVICE MODE – SERVICE HOURS COUNTER FUNCTION

The service hours counter function is used for setting time intervals (per 10 hours) for regular maintenance purposes on machine and/or pump.

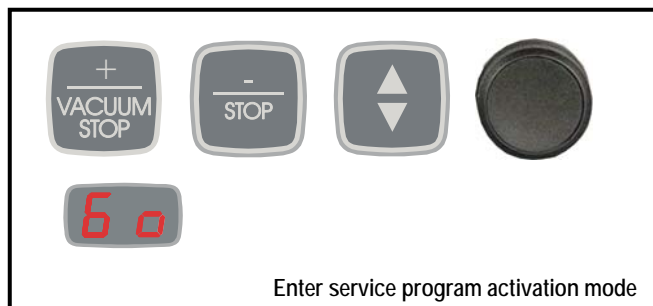


After expiration of set time interval, the control panel will provide the signal { OIL } that the interval has expired and maintenance can be done. Signal disappears after 3 seconds and machine can be used. However, signal is coming back each time when machine is started up.

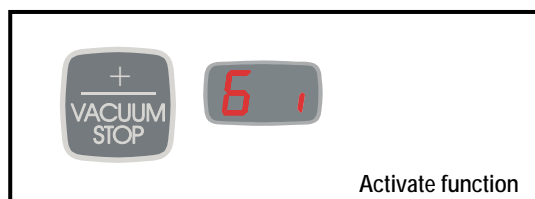
Pay attention that the function only counts the hours that the pump is running (so only cycle times).

Standard factory setting function is OFF position.

ACTIVATE SERVICE HOURS COUNTER FUNCTION

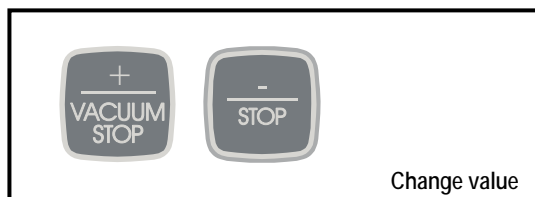
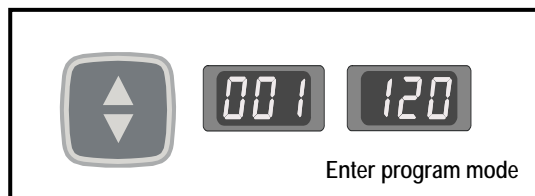


1. Machine is OFF
2. Push [+ | VACUUM STOP], [- | STOP] and [SELECTION] button and turn on machine while pushing these buttons.
3. Keep pushing the buttons for at least 2 seconds until { 60 } appears on screen. Release buttons after appearance of { 60 } which is the number for service hours counter program.



4. Push [+ | VACUUM STOP] button for activation program. Signal { 61 } appears now in display. This indicates that the program has been activated. For de-activation push [- | STOP] button.
5. For storing the activation, close the lid.

SET SERVICE HOURS COUNTER FUNCTION



When function has been activated, the service hours can be set as follows :

1. Machine is ON. Push [SELECTION] button for at least 5 seconds. After 5 seconds, the consumed hours (per 10 hours) appear for three seconds before displaying the set service hours (standard setting is 12 which indicates 120 hours).
2. Push [+ | VACUUM STOP] or [- | STOP] buttons to increase or decrease the set value (per 10 hours).
3. Storing the value will be done by pushing the [SELECTION] button once again.

SERVICE MODE – ADDITIONAL SERVICE INDICATOR FUNCTION

This additional service indicator is meant to help the customers to use the conditionings program.



After expiration of default time of 120 hours, the control panel will provide the signal, a flashing “C”. This indicates preset time has expired and pump conditionings program should be used. (read more about conditioning program on page 25)

If the operator wishes to use the pump conditionings program, he should press the special

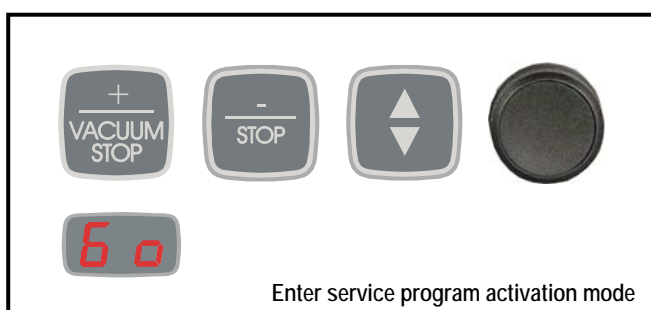


button.

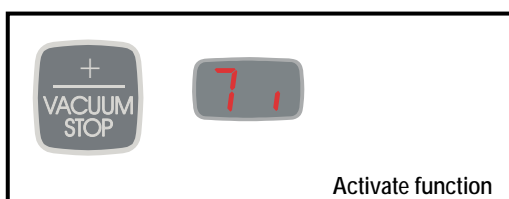
By pressing the function key, the control will return to the standard program mode. But next time the machine is activated, the flashing “C” will appear again as reminder. Once one complete pump conditioning cycle is completed, the counter will be reset.

Standard factory setting function is OFF position.

ACTIVATE ADDITIONAL SERVICE INDICATOR FUNCTION



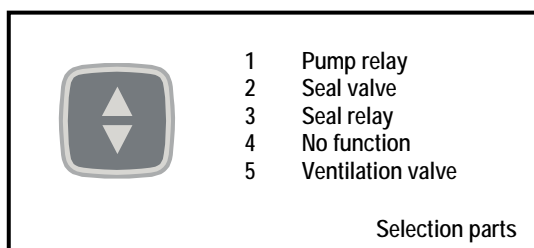
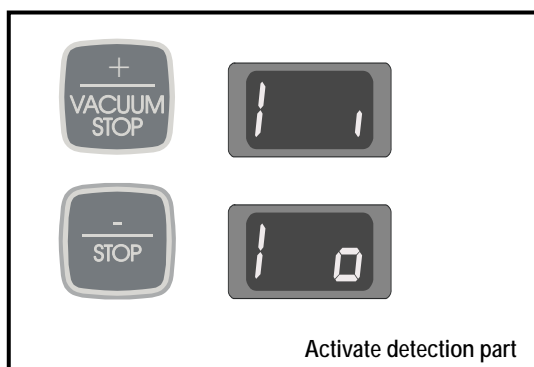
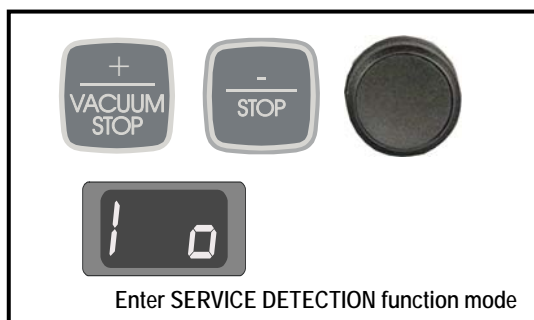
1. Machine is OFF
2. Push [+ | VACUUM STOP], [- | STOP] and [SELECTION] button and turn on machine while pushing these buttons.
3. Keep pushing the buttons for at least 2 seconds until { 7 0 } appears on screen. Release buttons after appearance of { 7 0 } which is the number for service hours counter program.



4. Push [+ | VACUUM STOP] button for activation program. Signal { 7 1 } appears now in display. This indicates that the program has been activated. For de-activation push [- | STOP] button.
5. For storing the activation, close the lid.
6. The default factory setting is 120 hours and is not changeable.

SERVICE MODE – SERVICE DETECTION (GATE TEST) FUNCTION

The service detection function can detect whether certain selected parts will be activated during operation or not. This is convenient when the machine has a problem and the technician has not idea yet where might be the cause of the problem.



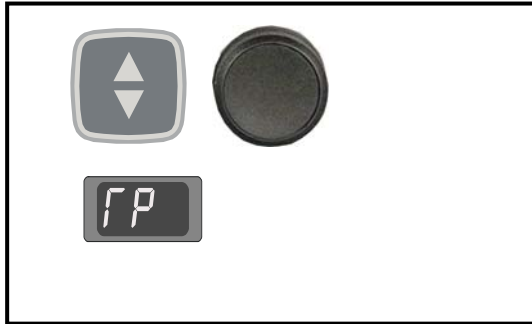
ACTIVATE AND USE SERVICE DETECTION FUNCTION

1. Machine is OFF.
2. Push [+ | VACUUM STOP] or [- | STOP] buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing both buttons for at least 5 seconds. First the starting codes appear and after 5 seconds { 1 o } appears in large display. { 1 o } indicates part 1 in OFF position.
4. Push [+ | VACUUM STOP] button to activate the selected part . Push [- | STOP] button to de-activate the selected part. When the part is physically activated and de-activated (you hear a click).
5. Push SELECTOR button to select part no. which is required to be detected. See list of part no. in overview. Please pay attention that for part numbers 3, the maximum activation time is 3 seconds. Longer activation time will result in burns on sealing bar or other relevant parts.
6. Switch off and turn on machine again to return to operation mode.

SERVICE MODE – FACTORY SETTINGS FUNCTION

The factory settings function is used for returning all values and settings (operation mode and service mode) in the control panel to the original factory setting.

ACTIVATE AND SET FACTORY SETTINGS FUNCTION



1. Machine is OFF.
2. Push SELECTOR button and turn on machine with ON/OFF switch while pushing button.
3. Keep pushing button for at least 5 seconds. First the starting codes appear and after control panel is returned to factory settings/3 seconds { rP } appears in large display.
4. Release SELECTOR button and control panel returns automatically all values and setting to original factory settings.

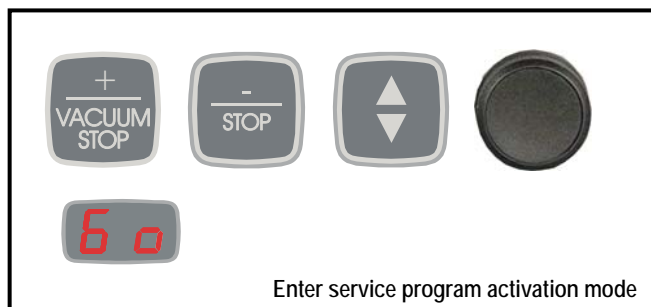
ERROR CODES

F 1 = De-activation of micro switch during cycle run.

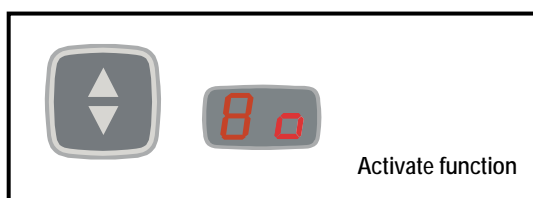
SPECIAL OPTION - EXTERNAL VACUUM FUNCTION (only available for Table Models)

External vacuum function is used for vacuuming special food containers. The function comes with a special adaptor which should be connected to the vacuum opening of the machine and suction opening of the food container. The function should be activated and set through the control panel as well. See operation procedures in user manual. See for setting and activation procedures below :

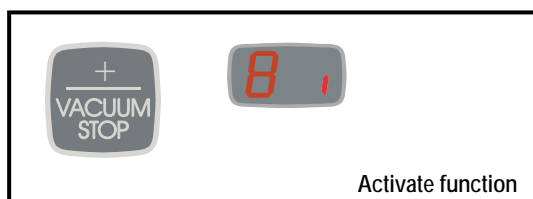
ACTIVATE EXTERNAL VACUUM FUNCTION



1. Machine is OFF
2. Push [+ | VACUUM STOP], [- | STOP] and [SELECTION] button and turn on machine while pushing these buttons.
3. Keep pushing the buttons for at least 2 seconds until { 6 0 } appears on screen. Release buttons after appearance of { 6 0 } which is the number for service hours counter program.



4. Push [SELECTION] button twice for appearance of { 8 0 } on screen which is the number for external vacuum option.



5. Push [+ | VACUUM STOP] button for activation program. Signal { 7 1 } appears now in display. This indicates that the program has been activated. For de-activation push [- | STOP] button.
6. For storing the activation, close the lid.

USE EXTERNAL VACUUM FUNCTION

EXTERNAL VACUUM function can be selected in operation mode through

pushing button [CONDITIONING PROGRAM].



appears in display.

Subsequently, push button [SELECTION]



appears in display.

E stands for "external vacuum".

External vacuum is now ready for use.

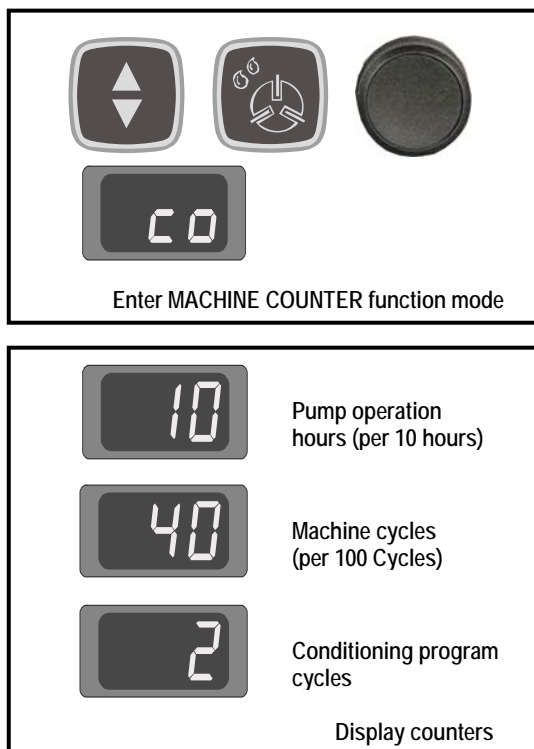
To active the function push  and the pump start to run (max. for 15 min).

To de-activate push the  button and the pump stops.

SERVICE MODE – MACHINE COUNTER FUNCTION

The machine counter function registers the use of machine and certain functions for a solid reference on the state and use of the machine. Total hours which the pump has run, total number of cycles which the machine has run, and total number of cycles which the pump conditioning program has run will be displayed in the function.

ACTIVATE MACHINE COUNTER FUNCTION



1. Machine is OFF.
2. Push SELECTOR and CONDITIONING PROGRAM buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing for at least 5 seconds. First the starting codes appear and after 5 seconds { co } appears in large display.
4. Release buttons, after 5 seconds the control panel displays subsequently machine hours (per 10 hours) which the machine has run, number of cycles (per 100 cycles) which the machine has run, and last the number of cycles which the conditioning program has run. The three indications appear each for 2 seconds in display.
5. After that the control panel automatically returns to the standard operation mode.

The values cannot be deleted. When the values reach 99, it returns automatically to 0 and starts again.

DIGITAL CONTROL

10 program control system



CONTROL PANEL VERSIONS

General

The digital control panels are implemented with 9 pre-select programs that can be individually set with different function values (to be able to pack different products) Program 0 can not be set and is used for servicing and testing. A program cycle is the complete program of set functions that the machine runs through to package a product.

The control panels are designed with a operation mode and a program mode. The operation mode is used during operational activities for selecting the program number with the required program cycle. The set values of the function program can also be seen in the operation mode but not changed.

The program mode is used to change the function values within the programs.

The control panels are implemented standard with an automatic conditioning program for the regular maintenance of the pump and two STOP keys for complete cycle interruption or for only active function interruption. There are also a number of built-in service programs. Contact South Coast Systems for more information about these programs.

Digital Time Control

The value of all active functions can be set for a certain time period.

The vacuum function, gas flush function (if installed), and soft air function can be set in whole seconds up to a maximum of 99 seconds.

The seal function can be set with an interval of 0.1 seconds and a maximum of 6.0 seconds.

Digital Sensor Control

The value of the vacuum function and the gas flush function (if installed) can be set as a percentage of the vacuum. This is the percentage of the under pressure in the vacuum chamber related to the outside pressure 1 atmosphere/ATO (0%).

The maximum vacuum percentage setting of the vacuum function is 99%.

The minimum vacuum percentage setting of the gas flush function is 30%. This means that the chamber is flushed with gas to 30% under pressure in relation to 1 atmosphere. It is often expressed as 70% is flushed with gas ($99\% - 30\% = 70\%$).

The time for the soft air function can be set on whole seconds (max. 99 seconds).

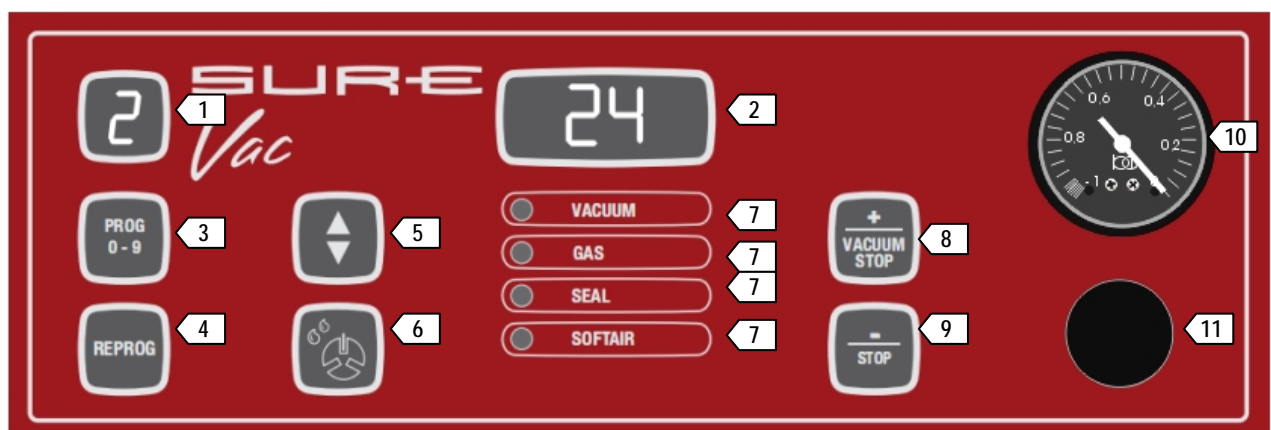
The time for the seal function can be set on 0.1 seconds (max. 6.0 seconds).

The digital sensor control comes standard with the VACUUM PLUS function. The VACUUM PLUS function is a time operated additional vacuum function for setting extra time after reaching the 99% value of the vacuum function (only applicable if 99% is set for the vacuum function). This function provides additional vacuum time for vacuuming any trapped air out of the package.

Digital Multi-cycle Option

The digital multi-cycle control is a special option on the digital time control for running more vacuum and gas flush or rest sub-cycles continuous before going to seal function. The control is useful for packaging applications which require a very low rest-oxygen in the package or which requires rest times between vacuum to let the air out of the package or product. The maximum number of vacuum-gas flush (or rest) sub-cycles before proceeding to seal function is five. The value specifications of the option is the same to the digital time control. For activating and setting the multi-cycle option, please review on page 47.

CONTROL PANEL LAY-OUT



1. Small Display

Displays active program in operating and program modes.

2. Large Display

Displays the current value of the active function during the program cycle or the set value of the selected function in operation or program mode.

3. PROG 0-9 Key

Selects program number in operation or program mode.

4. REPROG Key

Switch from operation mode to program mode (for setting function values) and vice versa. After setting new function value(s) within a selected program in program mode, this key must always be used to store the new values for the program in memory.

5. FUNCTION SELECT Key

Selects function within selected program in operation and program mode. The function is selected if the function light is on in front of the function description under the large display.

6. CONDITIONING PROGRAM Key

Start the conditioning program for pump (duration 15 minutes). For instructions on the program, see page 36.

7. FUNCTION Lights

A light in front of the function indicates that the function is active during the program cycle or that the function is selected during the operation or program modes.

Special Remark There is an additional time operated vacuum function available at digital sensor control, the VACUUM PLUS function. This function is not displayed on the panel. The VACUUM PLUS function can only be activated if the standard vacuum function is set to 99%

VACUUM PLUS function display during the cycle (if activated) : The vacuum indicator light remains on after 99% is reached and during the time set for VACUUM PLUS. During the VACUUM PLUS vacuum cycle a dot appears in the right lower corner of the large display.

Display during operation and program mode : If the VACUUM PLUS time is activated during the selected program then a dot appears in the lower right-hand corner of the large display during the operation and program mode. If the functions are selected using the function selection keys then the indicator light in front of VACUUM comes on twice, and the vacuum percentage and VACUUM PLUS time are shown consecutively.

Special Remark *If the machine has the gas flush function implemented and the function is activated within the selected program then a dot appears in the lower right hand corner of the small display when selecting the program no..*

8. + / STOP VACUUM Key

Function during cycle Interruption of the active function during the program cycle. The cycle immediately continues with the next function.

Function in program mode Raise the value of the selected function within the program selected in the program mode.

9. - / STOP Key

Function during cycle Terminates the program cycle completely. The cycle immediately switches to the ventilation function.

Function in program mode Lower the value of the selected function within the program selected in the program mode.

10. Vacuum meter

Displays the pressure in the vacuum chamber. See the following table for the relationship between the vacuum meter and the percentage vacuum.

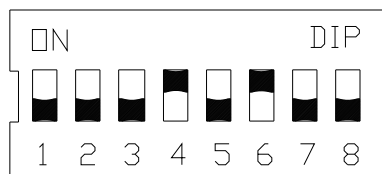
<i>Position vacuum meter</i>	<i>Vacuum percentage</i>
0	0
0.2	20
0.3	30
0.4	40
0.5	50
0.6	60
0.7	70
0.8	80
0.9	90
- 1.0	99+

11. ON/OFF Switch

The ON/OFF switch is used to turn the machine on and off before and after operation. The switch turns on the control panel for operating the machine. Caution, the switch does not completely remove all power from the machine.

DIPSWITCH SETTINGS / STARTING CODES

The dipswitches on the printed circuit board are to be used to activate several (optional) functions on the control.



ON POSITION	ACTIVATION
1	Multi-cycle control
2	Continuous pump running Pre-seal factory setting 1.0 seconds / After-seal factory setting 2.5 seconds
3	Pump conditioning program on separate conditioning program button
4	Soft air ventilation
5	1-2 Cut off seal (separate time settings for seal and cut)
6	Gas flush injection function
7	Digital sensor control function
8	Quick Stop H ₂ O Sensor

SERVICE MODE – PUMP CONDITIONING PROGRAM



The conditioning program ensures that the pump is thoroughly rinsed. During the program the pump and oil reaches operation temperature so that the oil can better absorb any moisture and contaminants and filter them. The high temperature enables any moisture in the pump to evaporate minimising the risk for rust spots.

The program lasts 15 minutes and it is advisable to run it at least once a week. Turn on the machine, press the key [conditioning program], and close the lid. The program runs automatically. During the program the large display will display moving lines.

The program can be interrupted at any time using the [STOP] key. It is however important for the sake of good maintenance that the program completes a full 15 minute cycle and therefore advisable only to interrupt the cycle for something urgent.

It is also advisable to run the program before using the machine for the first time, after the machine has been stationary for a lengthy period of time, and especially prior to changing oil.

SERVICE MODE - SLEEPER TIME FUNCTION

Sleeper time function is used for automatic stop of vacuum pump running after set time in sleeper time function when machines has not been used during the set time.

When machine is used again by closing the lid, the vacuum pump starts automatically running again.

Sleeper time function is only useful when dilswitch (continuous pump running) is ON.

Standard factory setting function is OFF position.

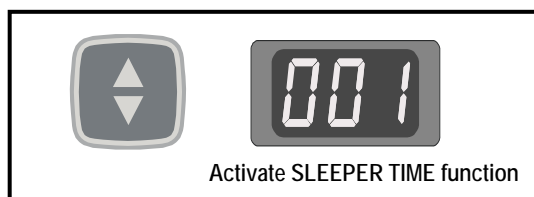
ACTIVATE AND SET SLEEPER TIME FUNCTION



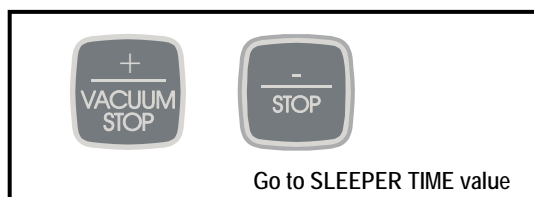
1. Machine is off
2. Push [FUNCTION SELECTION] button and [+ | VACUUM STOP] buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing both buttons for at least 5 seconds. First the starting codes appear and after 5 seconds { SL o } appears in large display. { SL o } indicates sleeper function in OFF position.
4. Release buttons



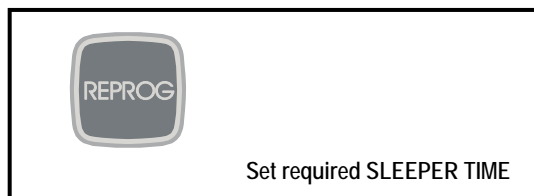
5. Push [+ | VACUUM STOP] button once and { SL I } changes to { SL o }. This means sleeper function is activated.



6. Push [FUNCTION SELECTION] button and { 001 } appears in screen. This indicates the time interval for the sleeper function. The time interval is 6 seconds so { 001 } means that after 6 seconds not using the machine, the pump stops running.



7. Push [+ | VACUUM STOP] or [- | STOP] buttons to increase or decrease the number of time intervals with a minimum of { 001 } which is 6 seconds and a maximum of { 099 } which is 5.994 seconds (appr. 10 minutes)



8. After setting the desired time interval, push [REPROG]

button to store activation and setting. Control panel returns automatically to standard operation mode.

SERVICE MODE – SERVICE HOURS COUNTER FUNCTION

The service hours counter function is used for setting time intervals (per 10 hours) for regular maintenance purposes on machine and/or pump.



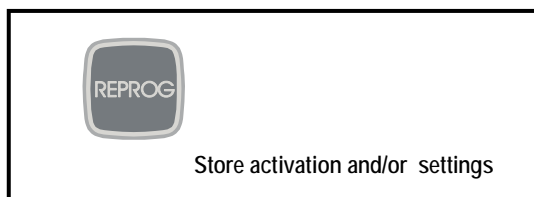
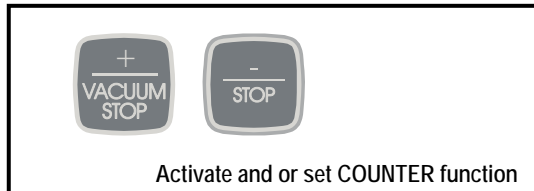
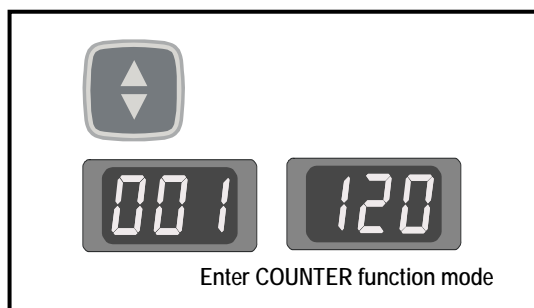
After expiration of set time interval, the control panel will provide the signal { OIL } that the interval has expired and maintenance can be done. Machine can still be used for normal operation after appearance but the signal keeps coming back.

Moreover, the function also displays the already consumed hours within the set time interval.

Pay attention that the function only counts the hours that the pump is running. So when the pump is not running continuously (BOXER series), the counter only counts the time that the pump is running (vacuum function).

Standard factory setting function is OFF position.

ACTIVATE AND SET SERVICE HOURS COUNTER FUNCTION

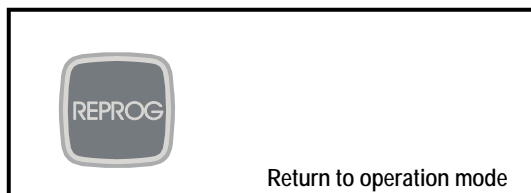
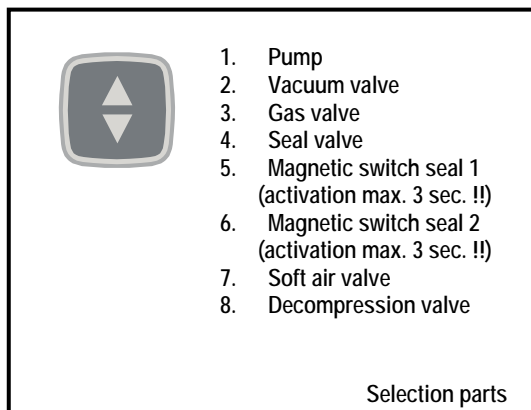
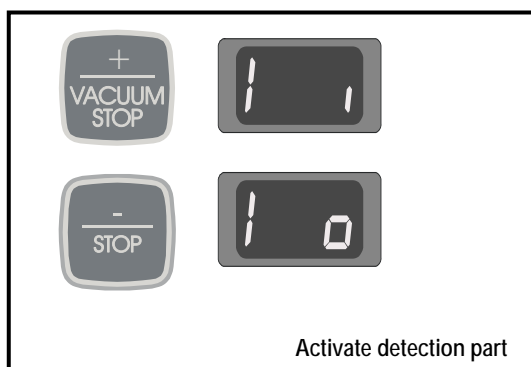
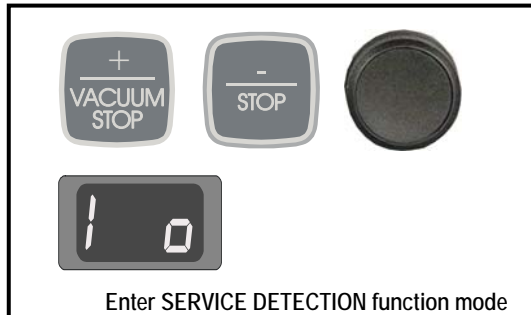


1. Machine is ON
2. Push [FUNCTION SELECTION] button for at least 3 seconds.
3. After 3 seconds, the already consumed time (per 10 hours) will appear on display for 2 seconds (value between 0 and 99). After display switches to originally set service hours interval (per 10 hours). When function has not been activated, there will be no appearance of already consumed time and OFF will appear on display after 3 seconds.
4. Push [+ | VACUUM STOP] or [- | STOP] buttons to activate and/or reset the required service hours interval. The number on the display reflects 10 hours of operation. So minimum value 1 indicates 10 hours and maximum 99 means 990 hours. When set to value 0, this means that the function will be de-activated (next time when function mode is entered, OFF will appear on display).
5. Push REPROG button to store new value in function. Consumed hours will also be reset by this procedure. Control panel will return automatically to operation mode.

SERVICE MODE – SERVICE DETECTION (GATE TEST) FUNCTION

The service detection function can detect whether certain selected parts will be activated during operation or not. This is convenient when the machine has a problem and the technician has not idea yet where might be the cause of the problem.

ACTIVATE AND USE SERVICE DETECTION FUNCTION

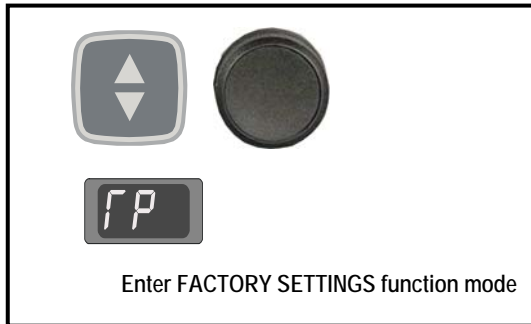


1. Machine is OFF.
2. Push [+ | VACUUM STOP] and [- | STOP] buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing both buttons for at least 5 seconds. First the starting codes appear and after 5 seconds { 1 o } appears in large display. { 1 o } indicates part 1 in OFF position.
4. Push [+ | VACUUM STOP] button to activate the selected part . Push [- | STOP] button to de-activate the selected part. When the part is physically activated and de-activated (you hear a click).
5. Push SELECTOR button to select part no. which is required to be detected. See list of part no. in overview. Please pay attention that for part numbers 5 or 6, the maximum activation time is 3 seconds. Longer activation time will result in burns on sealing bar or other relevant parts.
6. Push REPROG button to return to operation mode.

SERVICE MODE – FACTORY SETTINGS FUNCTION

The factory settings function is used for returning all values and settings (operation mode and service mode) in the control panel to the original factory setting.

ACTIVATE FACTORY SETTINGS FUNCTION

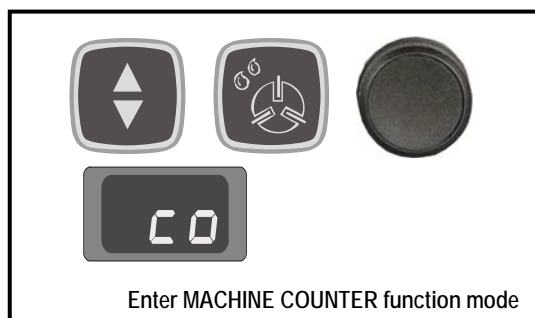


1. Machine is OFF.
2. Push SELECTOR button and turn on machine with ON/OFF switch while pushing button.
3. Keep pushing button for at least 3 seconds. First the starting codes appear and after 3 seconds { rP } appears in large display.
4. Release SELECTOR button and control panel returns automatically all values and setting to original factory settings. Only machine counter values (see next page) remain on present value.

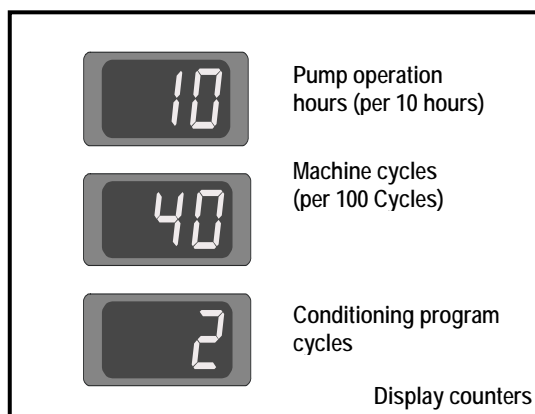
SERVICE MODE – MACHINE COUNTER FUNCTION

The machine counter function registers the use of machine and certain functions for a solid reference on the state and use of the machine. Total hours which the pump has run, total number of cycles which the machine has run, and total number of cycles which the pump conditioning program has run will be displayed in the function.

ACTIVATE MACHINE COUNTER FUNCTION



1. Machine is OFF.
2. Push SELECTOR and CONDITIONING PROGRAM buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing button for at least 5 seconds. First the starting codes appear and after 5 seconds { co } appears in large display.
4. Release buttons and after 5 seconds control panel displays subsequently machine hours (per 10 hours) which the machine has run, number of cycles (per 100 cycles) which the machine has run, and last the number of cycles which the conditioning program has run. The three indications appear each for 2 seconds in display.
5. After control panel return automatically to standard operation mode.

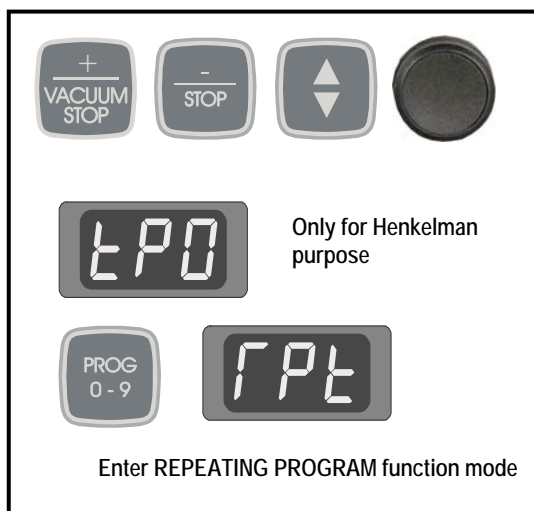


The values cannot be deleted. When the values reach 99, it returns automatically to 0 and starts again.

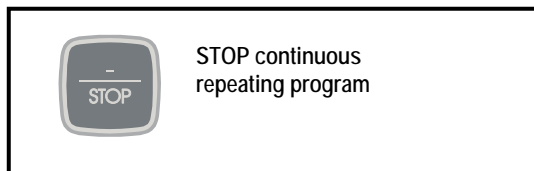
SERVICE MODE – REPEATING PROGRAM FUNCTION

The repeating program function is used for continuously repeating a program for testing whether problems would arise when machine is running for longer time.

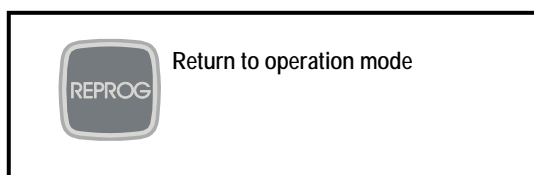
ACTIVATE REPEATING PROGRAM FUNCTION



1. Machine is OFF.
2. Push [+ | VACUUM STOP], [- | STOP] and SELECTOR buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing button for at least 5 seconds. First the starting codes appear and after 5 seconds { tPO } appears in large display. This function is only for Henkelman internal purposes.
4. Push [PROG 0-9] button once and mode changes to REPEATING PROGRAM function mode. { tPO } changes to { rPt }.
5. Close the lid and the program which has been selected in operation mode will start running continuously.



6. Push [- | STOP] button to interrupt the function and push [REPROG] button to return to operation mode.

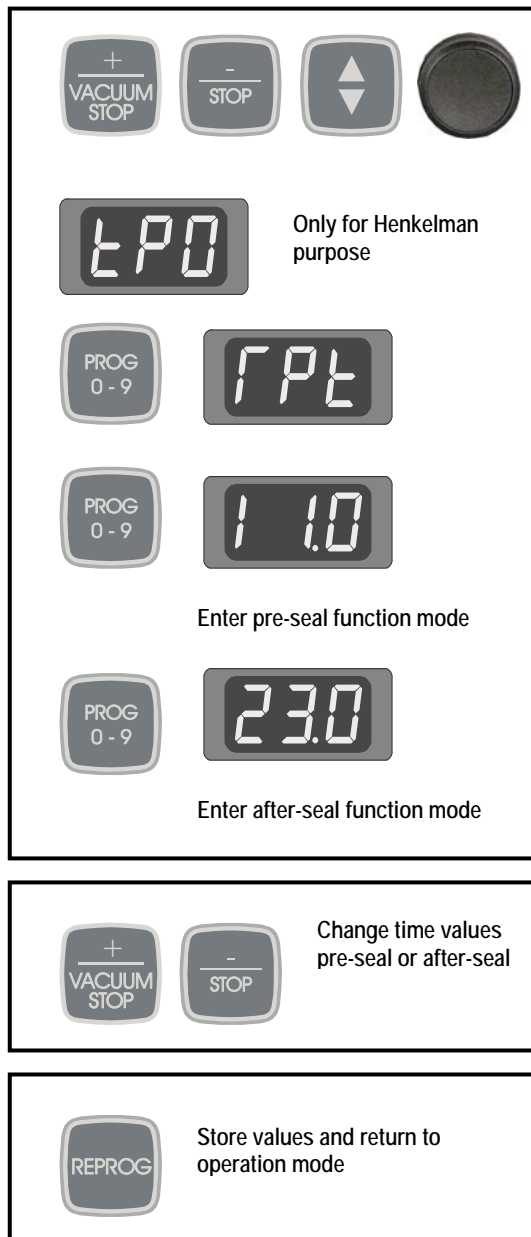


7. Push [REPROG] button for returning to operation mode

SERVICE MODE – PRE-SEAL AND AFTER-SEAL FUNCTION

The pre-seal and after-seal function enables to change the time settings for pre-seal and after-seal.

ACTIVATE PRE-SEAL AND AFTER-SEAL FUNCTION



1. Machine is OFF.
2. Push [+ | VACUUM STOP], [- | STOP] and SELECTOR buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing button for at least 5 seconds. First the starting codes appear and after 5 seconds { tPO } appears in large display. This function is only for Henkelman internal purposes.
4. Push [PROG 0-9] button twice and mode changes to PRE-SEAL function mode, { 1 1,0 }. The first value 1 indicates pre-seal mode. The second value 1,0 indicates the pre-seal time.
5. Push [PROG 0-9] button once more and mode changes to AFTER-SEAL function mode, { 2 3,0 }. The first value 2 indicates after-seal mode. The second value 3,0 indicates the after-seal time.
6. Change time settings by using [+ | VACUUM STOP] and [- | STOP] buttons when selected either mode.
7. When settings have been changed upon required time, push [REPROG] button to store new values and return to operation mode.

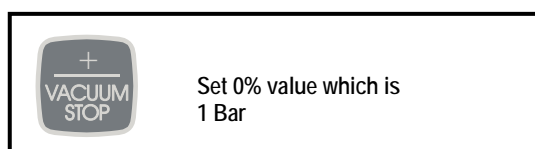
SERVICE MODE – SENSOR CALIBRATION FUNCTION

The sensor calibration function sets the right pressure values to the corresponding vacuum percentage values. For this calibrating the sensor function, a digital vacuum meter is required

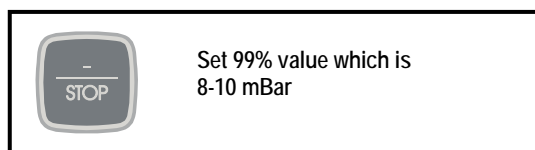
ACTIVATE SENSOR CALIBRATION FUNCTION



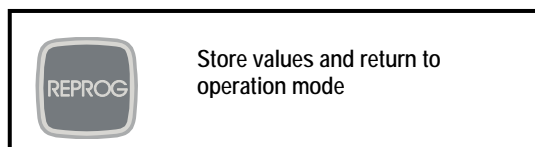
1. Machine is OFF.
2. Push [+ | VACUUM STOP], [- | STOP] and SELECTOR buttons at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing button for at least 5 seconds. First the starting codes appear and after 5 seconds { tPO } appears in large display. This function is only for Henkelman internal purposes.
4. Push [PROG 0-9] button 4 times for entering the CALIBRATION function , { CAL }.
5. Place digital vacuum meter in chamber.



6. Push [+ | VACUUM STOP] button for setting the 0% vacuum value (which is 1 Bar).



7. Close the lid and keep it closed while pushing [- | STOP] button. The pump starts to run now. Keep pushing the [- | STOP] button until the digital vacuum meter shows appr. 8-10 mBar.



8. Release [- | STOP] button. This is the setting for 99% vacuum value.
9. Push [REPROG] button to store new values and return to operation mode.

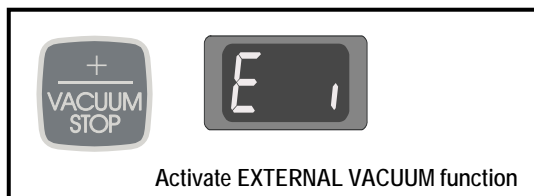
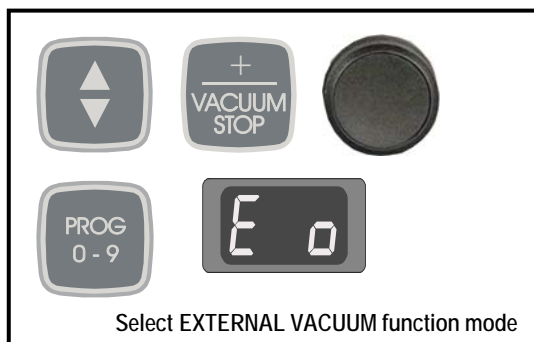
ERROR CODES

- F 1 = De-activation of micros witch during cycle run. For example when gas flush function is set at a too high value and lid opens.
- F 2 = For sensor control panel. Starting pressure is not equal to set start pressure of sensor. For example, when there is a tube bended and still vacuum (low pressure) in the system.

SPECIAL OPTION - EXTERNAL VACUUM FUNCTION (only available for Table Models)

External vacuum function is used for vacuuming special food containers. The function comes with a special adaptor which should be connected to the vacuum opening of the machine and suction opening of the food container. The function should be activated and set through the control panel as well. See operation procedures in user manual. See for setting and activation procedures below :

ACTIVATE AND SET EXTERNAL VACUUM FUNCTION



1. Machine is off
2. Push [FUNCTION SELECTION] button and [+ | VACUUM STOP] button at same time and turn on machine with ON/OFF switch while pushing buttons.
3. Keep pushing both buttons for at least 5 seconds. First the starting codes appear and after 5 seconds { SL o } appears in large display. This is the SLEEPER TIME function mode.
4. Release buttons
5. Push [PROG 0-9] button once and mode changes to EXTERNAL VACUUM function mode. { SL o } changes to { E o }.
6. Push [+ | VACUUM STOP] button once and { E o } changes to { E 1 }. This means EXTERNAL VACUUM function is activated.
7. Push [REPROG] button for storing the activation of function.
8. Control panel returns automatically to operation mode.

EXTERNAL VACUUM function can be selected in operation mode through button [PROG 0-9] until { E } appears in small display.

SPECIAL OPTION – MULTI-CYCLE CONTROL FUNCTION

The multi-cycle control option is used for packaging applications which require very low oxygen rests in package. The operation mode cycle of the multi-cycle control is automatically repeating vacuum and gas flush functions with a maximum of five times before proceeding to seal function.

The repetition of the vacuum and gas flush functions results in an optimum reduction of oxygen rests because during each repetition the oxygen rests mix with gas and being then vacuumed again. So the oxygen percentage left in package is reduced to minimum.

Special note :

For normal industrial or retail applications, the multi-cycle control does not create any considerable benefits for the package or product shelf life. The vacuum achieved with normal controls are more than sufficient. Multi-cycle control is only used for highly special laboratory or product applications.

MASTER CYCLE MULTI-CYCLE CONTROL

Vacuum function 1 ► Gas flush function 1 ► Vacuum function 2 ► Gas flush function 2 ►
Vacuum function 3 ► Gas flush function 3 ► Vacuum function 4 ► Gas flush function 4 ►
Vacuum function 5 ► Gas flush function 5 ►
Sealfunction ► Soft air ventilation function ► Ventilation function

For setting the suitable program, functions can be set on OFF position so it is possible to have for example only 2 or 1 ½ repeating cycles.

ACTIVATE MULTI-CYCLE CONTROL

Change dilswitch 2 to ON position. Switch off and turn on machine and multi-cycle control is activated.

PROGRAM & SET MULTI-CYCLE CONTROL FUNCTION VALUES (ONLY MANUAL)



Machine is ON and multi-cycle control is activated.
Push [PROG 0-9] button for selection program to be programmed.



Push [REPROG] button to switch to program mode

There are five sets of vacuum-gas flush sub-cycles before going to seal function. The active set is indicated by the number of lines at the left side of the value for digital time control and at the right side of the value for digital sensor control.



Sub-cycle no. 1
vacuum-gas



Sub-cycle no. 2
vacuum-gas



Sub-cycle no. 3
vacuum-gas




Sub-cycle no. 4
vacuum-gas



Sub-cycle no. 5
vacuum-gas



So for example for digital time control when in program mode (program number is blinking), the light is on before VACUUM  and there are two lines in front of value, it indicates that the vacuum function value of the second sub-cycle is displayed and ready to be changed.



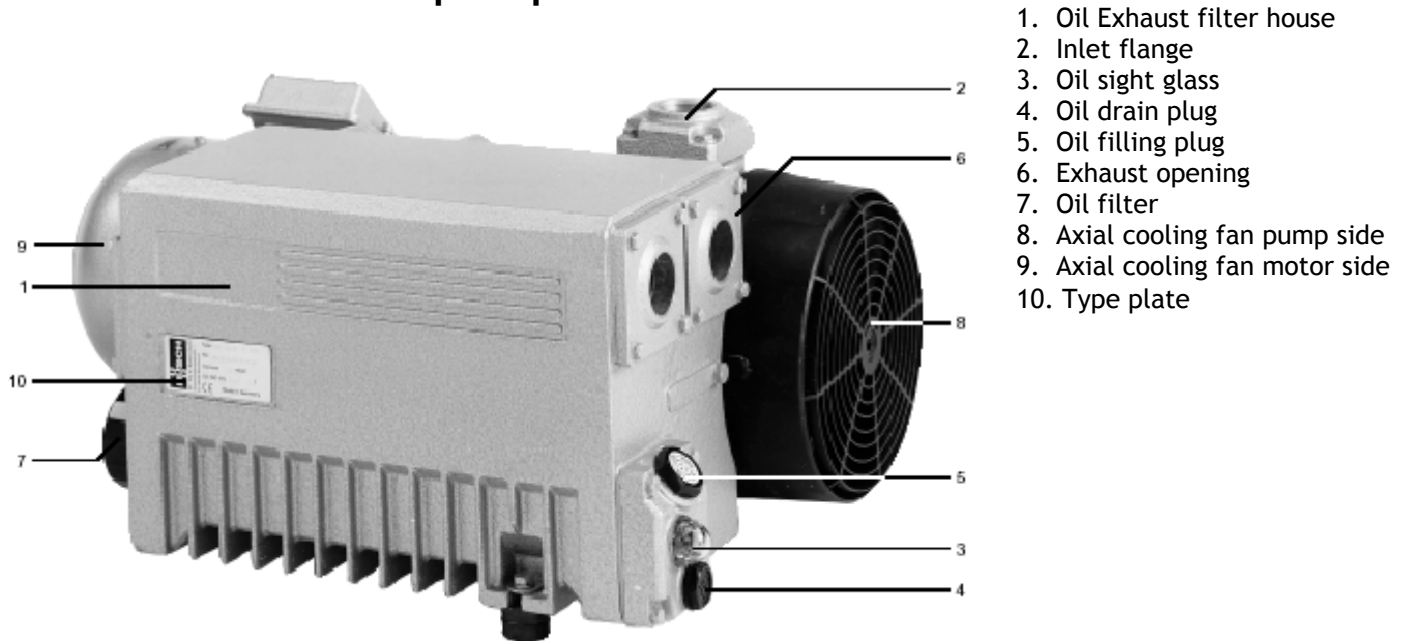
Push SELECTOR key for selecting the functions in the different (sub) cycles for programming. When relevant function is selected, use [+ | VACUUM STOP] or [- | STOP] buttons to increase or decrease the function value.

When all functions have been programmed (or set on OFF position), push [REPROG] button for storing the new values.

Special notes PROGRAMMING MULTI-CYCLE

- Values cannot be conflicting. For example for digital sensor control , vacuum function is programmed at only 50%, gas function in same sub-cycle cannot be set at 60%.
- When digital sensor control, there is also VACUUM PLUS function available at each vacuum-gas flush sub-cycle.
- For multi-cycle, only manual programming is possible.

The Busch vacuum pump:



OIL TYPES

Take note of the type of oil used for the pump. Another type of oil may damage the pump. The following types of oil can be used in the machines.

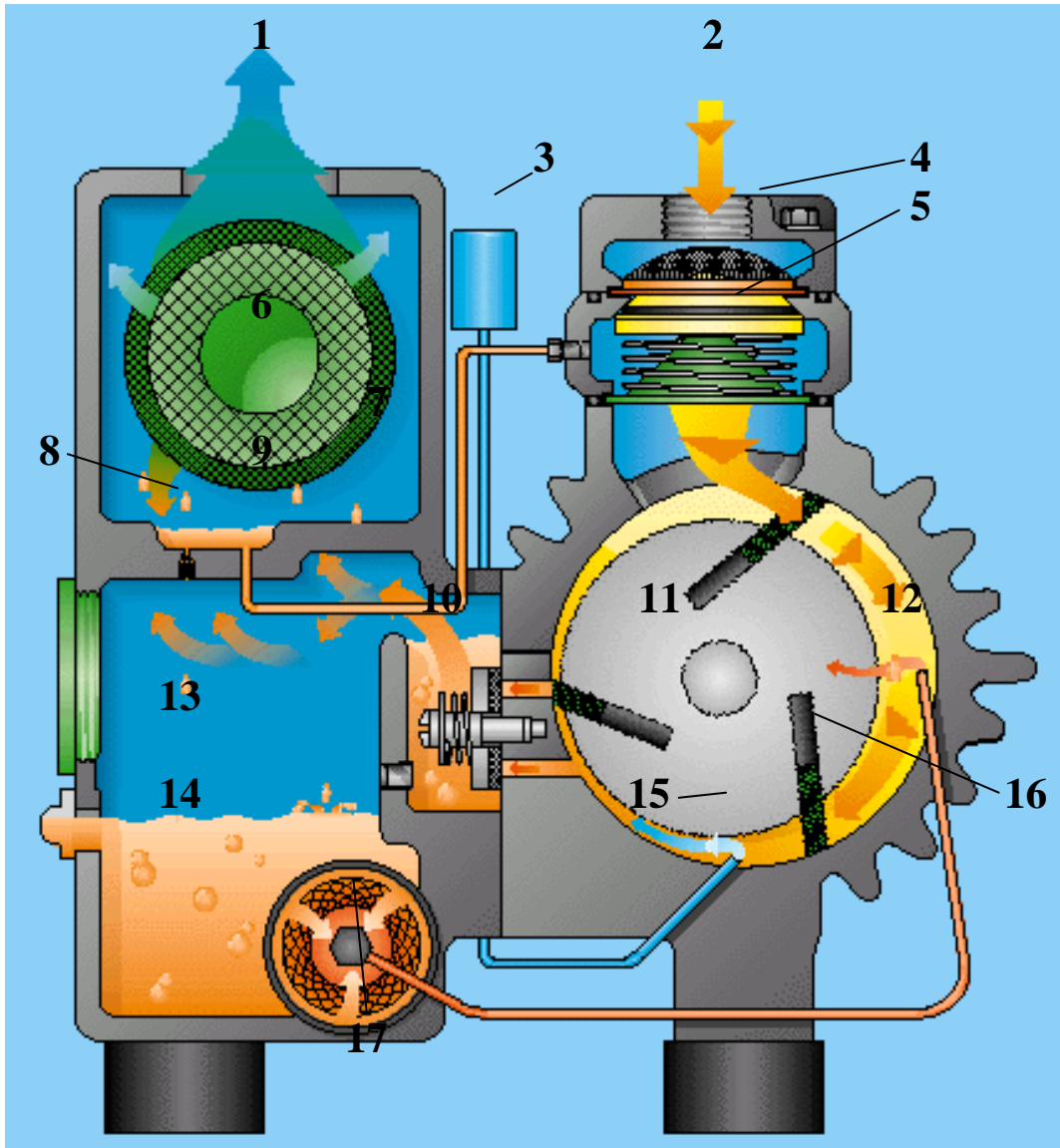
Machine type	Pump type	Oil quantity	Oil type
SV2804TE	004	0.06 litres	Viscosity VG 22
SV2808TE	008	0.25 litres	Viscosity VG 32
SV3716TE / SV4216TE / SV3516TP	016D	0.3 litres	Viscosity VG 32
SV4221TP / SV4221TX / SV4221TB	0021-B	0.4 litres	Viscosity VG VG 32

Examples of supplier's brands of these types of oil are Shell Vitrea 32, Aral Motanol GM 32, BP Energol CS 32 or Texaco Regal R+ O 32.

Machine type	Pump type	Oil quantity	Oil type
SV5263SP / SV3263SP / SV5263SA / SV8063SA / SV4563DA / SV5263SS / SV6263DS	063-122	1 litres	Viscosity VG 100
SV8010SA / SV5510DA / SV8010SS / SV6210DS	100-132	2 litres	Viscosity VG 100
SV6216DS	160-132	6.5 litres	Viscosity VG 100
SV8430DS / SV1130DS	302-132	6.5 litres	Viscosity VG 100

Examples of supplier's brands of these types of oil are Shell Vitrea 100, Aral Motanol GM 100, BP Energol CS 100 or Texaco Regal R+ O 100. The quantities of oil in the table are appropriate for the relevant pumps. The quantities of other types may differ. If the machine is used beyond normal ambient temperature specifications, consult your supplier for the correct type of oil.

Busch oil lubricated vane pump



- | | |
|-----------------------------|--------------------------------|
| 1 Exhaust air | 11 Rotor |
| 2 Air inlet | 12 Oil inlet |
| 3 Gas ballast valve | 13 Lower compartment |
| 4 Inlet screen | 14 Oil level lower compartment |
| 5 Non return valve | 15 Air inlet, from gas ballast |
| 6 Exhaust filter | 16 Vanes |
| 7 Top compartment | 17 Oil filter |
| 8 Oil return bolt | |
| 9 Oil level top compartment | |
| 10 Exhaust valve | |

Problem recognition

Vacuum:

Possible problems:

1. The vacuum process will not start
2. It takes too long to reach a proper level of vacuum.
3. It is impossible to reach a proper end vacuum.
4. The bag is not tight around the product (immediately after packaging process)
5. During the vacuum process the vacuum bag is expanding enormously.
During the vacuum process the bag is starting to move.
6. The level of vacuum is not consistent
7. The bag is not tight around the product (after a few days of storage)

Possible causes:

1. Mal functioning from the micro switch, or mal functioning from the vacuum valve.
2. The capacity from the pump is reduced.
3. The machine is leaking.
4. Improper setting from the vacuum level.
5. Distance between seal bar and counter bar is too small.
6. Proper functioning of the valves should be checked.
7. Possible damages from the vacuum bag
Possible released air that was trapped inside the core of the product

Possible solutions:

1. Check the proper functioning from the micro switch.
Check the proper functioning from the vacuum valve, electrical and pneumatically (membrane)
2. Check the quality and quantity of the oil / filters.

Change oil:

check the condition of the oil, (If very dirty decrease service indicator)

Change oil filter.

Check oil exhaust filter:

If this filter is polluted you have to change.

A polluted filter will result in: oil mist inside the packaging area.

A reduction of the pump capacity.

(it will take more time to reach the proper vacuum level).

We check the pollution of the exhaust filter with help of a pressure gauge.

If the gauge is indicating a pressure 0.6 Bar or higher, replace filter.



Check inlet screen of the vacuum pump:

If this filter is polluted you can clean it.

A polluted inlet screen will result in: a reduction of the pump capacity.

(it will take more time to reach the proper vacuum level).



3. Let the machine run to high vacuum, and activate the main switch so the electrical connection is deactivated. Check for leakage.
With help of the digital hand held vacuum meter, it is possible to visualise the leakage very clearly.



4. Check the settings, and check the end reached pressure inside the chamber, with help of the digital hand held vacuum meter.

5. Check the distance between seal bar and counter bar.

If the end vacuum of the pump and the end vacuum in the chambers are sufficient, then you must check the position of the seal bars and the contra bars.

If the contra bars and the seal bars are in line with each other you measure the space between the seal bar and the contra bar.

This you can do with clay as follows: from clay you make 3 small block of 15 x 15 x 15 mm and place these on both ends and in the middle of the contra bar or seal bar depending on the model. Close the lid to the start the vacuum process and when the vacuum meter has reached 0,8 Bar you push the stop button.



When the lid has opened you take the clay blocks of the bars and You measure the height. This height must be in between the 7 and 10 mm and equal over the total length of the seal bar.

If the space between seal bar and counter bar is to little then the air that needs to get out of the bag finds to much resistance to escape. You will have a perfect vacuum in the chamber while there is still air in the bag.

Possible reasons why the space between the contra bar and the seal bar is to small

- Dirt in the hole's of the seal bar or contra bar so it does not stand in it's lowest position.
 - Position of the seal cylinders
When the seal cylinders are adjusted to tight then the seal bar get's stucked so it can not come back in it's lowest position.
 - Pollution of the seal valve so it does not close totally. Because of this the seal bars will move up during the vacuum process and will close the open end of the vacuum bag.
 - When you have a leakage on the bottom side of the seal cylinder's then the seal cylinders come up during the vacuum process and this will also close the open end of the vacuum bag.
6. Check proper functioning of the vacuum valves.
Specially the membrane, the seals and the spring
7. Check the vacuum bag on possible damages, check if it is possible that the air was trapped inside the product, and was released after some time.

Gas:

Possible problems:

1. There is no gas in the package at all.
2. There is not enough gas in the package .
3. The amount of gas in the different packages is not equal
4. The level of gas supply not consisted, happening after a few hours of use.
5. The machine is gas flushing on the left side of the machine but not on the right side
(only in case of a double chamber)

Possible causes:

1. Disconnected or broken wires to the gas valve
There is no gas supply to the machine.
2. Insufficient setting for gas.
The position of the bag and or the gas nozzle is improper.
3. There is a pollution in the connection hose a that gas nozzle.
The position of the one bag and or one gas nozzle is improper.
4. The gas reducing unit is freezing. This is clearly showing by ice forming on the gas regulator
5. The micro switch for gas is mal functioning or needs to be adjusted.

Possible solutions:

1. Check the electrical connection to the gas valve.
Check the setting for gas, check the gas supply from the bottle.
2. Increase the setting, try to use a lower pressure or increase the size of the vacuum bag.
Check the position from gas nozzle.
3. Check the hoses.
Check the position from gas nozzle.
4. Use a gas regulator with a bigger capacity, or a heating element.
5. Check the adjustment and / or the proper functioning from the micro switch.

Sealing:

Possible problems:

1. The seal is burning.
2. The bags are sticking to the seal bar.
3. The seal is not equal.
4. The seal image is perfect, but it has no strength.
5. The seal area is full of wrinkles.
6. During sealing the vacuum level drops
7. If the cycle is finished, there is no seal

Possible causes:

1. The setting for seal time is too high.
2. The Teflon layer on the seal bar is damaged.
3. There is insufficient seal pressure.
4. Due to pollution on the seal area, the warmth could not be transmitted to both film sides.
5. The distance between seal bar and counter bar is too big, the used bag is too big in relation to the product.
6. The seal cylinders are not fastened properly.
7. The setting for gas is far too high.

Possible solutions:

1. Decrease the setting, and try again.
2. Change the Teflon layer on the seal bar.
3. If gas is used, try a new cycle without gas. (properly the seal pressure is decreased due to the use of gas. If gas was not used, check the proper functioning of seal cylinders or bags (depending on the type of machine). A damaged membrane or seal bag will result in insufficient seal pressure.
4. Clean the seal area, or try with an empty bag.
5. Check the distance between seal bar and silicone holder, it should be between 6 and 8 mm. If this distance would be too big, check position of the seal bar, seal cylinders or seal bags.
6. Fasten the seal cylinders.
7. Check the setting for gas. Decrease it and test again.

Soft-air:

Possible problems:

1. The soft-air function is not working.

Possible causes:

1. The soft-air function is not activated.
2. Disconnected or broken wires to the soft-air valve.

Possible solutions:

1. Check the setting
2. Check the electrical connection from the valve.

Decompression:

Possible problems:

1. The decompression function is not working.
2. The machine is decompression only partial.

Possible causes:

1. Disconnected or broken wires to the decompression valve.
2. The membrane of the decompression valve is damaged.
The vacuum valve is not closed completely

Possible solutions:

1. Check the wires and the voltage to the decompression valve.
2. Check if the membrane of the decompression valve is damaged.
Check if the vacuum valve is working properly.

Digital control

Possible problems:

1. The Display doesn't light up
2. The first display lights up and shows the program number, the second display is counting but nothing works.
3. Display is showing three little stripes which are jumping up and down.
4. Lid is open and the control is running through the program numbers.

Possible causes:

1. No power supply.
2. Fuses burned
3. Lid is closed, and machine is decompressing.
4. Micro switch is still closed.

Possible solutions:

1. Check the main power supply

Check the main switch at the back side of the machine.



Table Models



Single / double chamber models

Check the fuse on the control transformer 250 mA 9 Volt connection.



Check the fuse on the printed circuit board 250 mA
Check the connections on the cables
Check the 15 pins connector on the PCB



All items checked but still no solution

Replace the PCB board. Try the different functions, if everything seems to work, put back the previous PCB board. If the actual problem was caused by the PCB board, the machine should malfunction again.

If the machine function well with the old board (that was malfunction before), the actual cause of the problem is probably coming from, bad connection from connector and PCB board, or a breakage in the cable itself.

Maintenance:

Weekly (done by the customer)

Check condition seal bar: Teflon tape, seal wires, and position.

Check condition of seals: Counter profile for sealing, lid seal

Check condition of pump: Oil level, oil quality

Use Program "C" specific with Table models, and single chambers where sleeper function is active.

Every 4 till 6 month (done by service technician)

Check the vacuum level:

Change oil: check the condition of the oil,
If very dirty decrease service indicator
If clean increase service indicator

Change oil filter.



Check oil exhaust filter: If this filter is polluted you have to change.
A polluted filter will result in: oil mist inside the packaging area.
A reduction of the pump capacity. (it will take more time to reach the proper vacuum level).



We check the pollution of the exhaust filter with help of a pressure gauge.
If the gauge is indicating a pressure 0.6 Bar or higher, replace filter.



Check inlet screen of the vacuum pump:

If this filter is polluted you can clean it.

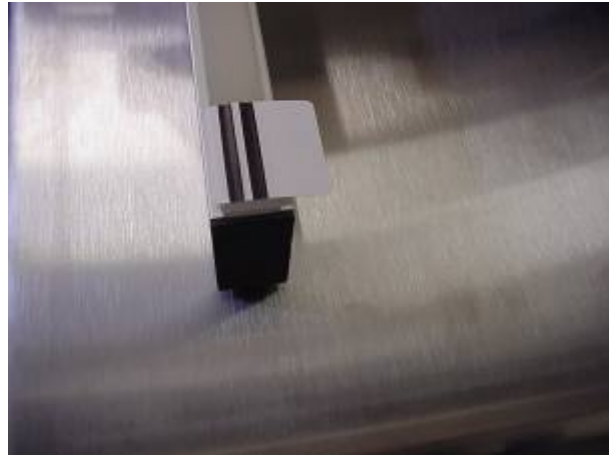
A polluted inlet screen will result in: a reduction of the pump capacity.
(it will take more time to reach the proper vacuum level).

Check condition seal bars:

For the correct maintenance on the seal bar check the instruction seal bar.

Teflon tape, seal wires, and position.

Check the position of the seal with help of thermic labels.



Check the gap between seal bar and counter bar:

Specially if the vacuum level from the pump and inside the chamber is correct, but the vacuum bag is not tight around the product



Check hinge parts:

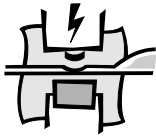
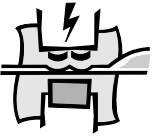


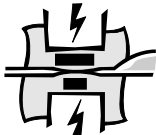
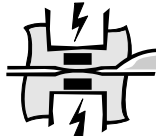
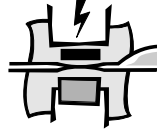
And lubricate if possible:

use Molycote Foodslip EP 2 Grease

USDA classification H1



Seal bar options / materials:

		Seal wires	Teflon tape
	Single seal	3,5 x 0,3 0305000	0305515
	Double seal	2 x (3,5 x 0,3) 0305000	0305515
	Cut-off seal	3,5 x 0,3 + Ø 1,1 mm 0305000 0305010	0305515
	Seal 1-2	3,5 x 0,3 + Ø 1,1 mm 0305000 0305010	0305515
	Bi- active seal (Double chamber)	8 x 0,2 mm + 5 x 0,2 mm 0305025 0305020	0305515
	Biactief (Single chamber)	2 x (5 x 0,2 mm) 0305020	0305515
	8 mm seal	8 x 0,2 mm 0305025	0305515

SERVICE KIT FOR PUMP TESTING

PORTABLE DIGITAL VACUUM METER

Type:GMH 3160-12 / 0 - 1300 MBAR ABSOLUTE

The vacuum meter is applicable for the following services:

- Check-up on the achieved and/or required final pressure in the vacuum chamber. The vacuum meter must either be placed into the chamber or the meter must be connected to the machine vacuum level display by the hose coupling on the top of the meter.
- Check-up final pressure vacuum pumps.

The results of services with the vacuum meter can be used for:

- Check the machine system for leakages.
- Comparative measurements with machine display results.



Pay attention that the results must be seen as an indication as the precision has limitations.

The meter in the service kit comes with 0,5 meter connection hose and T-shape

EXHAUST FILTER CONTROL METER

Connection plug 1"

The exhaust filter control meter is applicable for the following services:

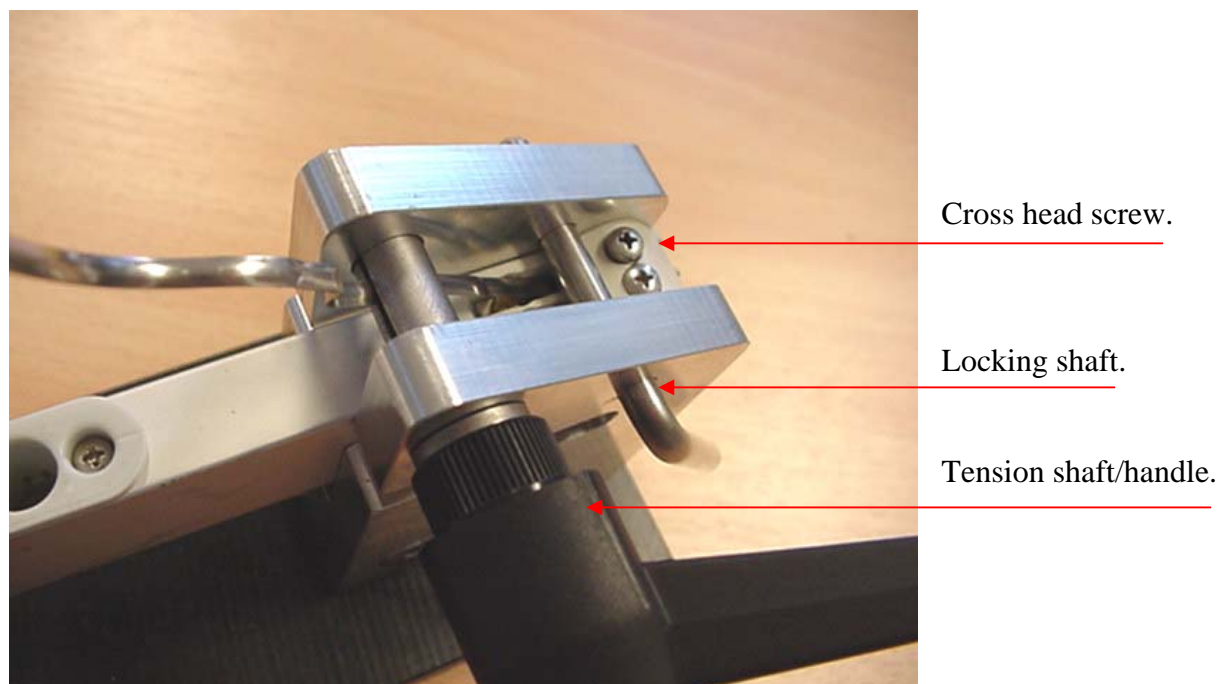
- Check-up pollution rate / condition of the exhaust filters inside the vacuum pump (it is not necessary to take the filters out). The different connection plugs are for the different capacity pumps in the pump range.



SEAL WIRE TENSION UNIT



Seal bar placed up side down in base fork.



By turning the handle the seal wire can be mount under tension and locked with the crosshead screw.